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 **IMS** Institute of Molecular Sciences

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1) PERSONAL DATA

Name: Carlos Alberto Nieto de Castro

Date and Place of Birth: 28 April 1949, Lisbon, Portugal

Social Status: Married to Maria José Lourenço. Three sons (49, 23, 21) and two daughters (44, 17). Four grand children

Present Position: Jubilated Professor, Chemical Physics of Fluids and Materials, FCUL (1979 to 2019), Chemistry and Biochemistry Department, Faculty of Sciences, University of Lisbon. Research Group Leader on Molecular Thermophysics and Fluid Technology, at Centro de Química Estrutural

PhD Engineering Sciences (Thermodynamics) – IST, Lisbon (1977)

Aggregation in Chemistry – FCUL, Lisbon (1980)

Stimulus for Excellence in Research Award, Portugal, 2005

IUPAC Fellow (2005)

Senior Member of Ordem dos Engenheiros (Chemical Engineering)

Member of American Chemical Society, Portuguese Chemical Society, European Society for Ionic Matter

PUBLONS - <https://publons.com/researcher/2807766/carlos-a-nieto-de-castro/>

WEB OF SCIENCE CORE COLLECTION: <https://www.webofscience.com/wos/author/record/B-7377-2011>

SCOPUS - <http://www.scopus.com/authid/detail.url?authorId=7005495215>

GOOGLE SCHOLAR - <https://scholar.google.com/citations?user=W-o-qmMAAAAJ>

ORCID - <http://orcid.org/0000-0001-9011-5132>

CIENCIA VITAE ID: 5C19-F1F0-0A68 <https://www.cienciavitae.pt/portal/5C19-F1F0-0A68>

2) EXECUTIVE SUMMARY

Carlos A. Nieto de Castro was born in Portugal in 1949. Full Professor at the Faculty of Sciences of the University of Lisbon since 1980, jubilated in 2019. Studied Chemical Engineering, and obtained his PhD in Engineering Sciences (Chemical Thermodynamics) from Instituto Superior Técnico, Portugal (1977). Received the Portuguese Stimulus to Excellence in Research Award, FCT-MCTES, Portugal (2005), the University of Lisbon Medal for distinguished service and has about 400 scientific publications including 38 books and chapters, one European patent and 550 conference presentations. He directed over 40 national and international funded projects, part of them involving industrial companies. Member of several international scientific boards and learning societies, he is an international evaluator under European, National, and International programs, associate editor of the Journal of Chemical and Engineering Data (ACS), editorial board member of several journals, IUPAC (2006) and International Association for Advanced Materials (Area Emerging Technologies for Energy Applications, 2022) Fellow. Prof. Carlos Nieto de Castro is one of world's most cited top scientists in Chemical Engineering/Physical Chemistry (top 2%), Stanford University Ranking, US, 2020, 2021, 2022, career and year. With more than 45 years dedicated to the research in thermodynamics and transport processes of fluids and materials, his actual scientific activity covers the field of molecular thermophysics and fluid technology, ionic liquids, molten salts, nanofluids, ionanofluids and nanosystems, including new heat and storage fluids with industrial impact in the area of energy and environment, and the use of ionic liquids as solvating and reaction media to synthesize and functionalize nanomaterials, for industrial and domestic applications.

Keywords: Thermophysics; Fluids and Materials (natural and synthetic); Ionic Liquids, Nanosystems, Nanofluids, Ionanofluids; Heat and Mass Transfer, Solar Energy

3) Scientific Specialization and Major Scientific or Technological Achievements

The main research interests of Carlos Nieto de Castro lie in the areas of Chemical Physics of Fluids and Materials Thermophysics. They include the development of accurate instrumentation and sensors for the measurement of transport and other properties of fluids (thermal conductivity, mass diffusion, viscosity, density, heat capacity, electrical permittivity) from cryogenic to high temperatures, from low to high pressures, at the highest metrological level. Natural and synthetic products, environmental chemistry, heat transfer equipment, thin films and microgravity studies were performed. Molecular theories and computer simulation (molecular dynamics) are used to understand the property values and macroscopic processes. Scientific metrology and the establishment of standard reference values for the thermal conductivity and viscosity of liquids since 1981 (IUPAC) are continuing interests. The area of Metrology induced the creation of the Laboratory of Measurements and Tests of ICAT, where the calibration of pressure transducers, thermometers, densimeters and viscometers were available to other institutions, industry included. The destruction of the ozone layer led to the study of the thermophysical properties of environmentally safe halocarbons, including electrical permittivity. The development of new materials and technologies justified new equipments and sensors for high temperatures (viscosity, thermal conductivity and electrical capacitance) and to the rigorous use of differential scanning calorimetry and thermogravimetry.

One of the key activities of his group is the development of new thin films sensors and ancillary equipment for the measurement of electrical and thermal conductivity and electrical permittivity, for several applications (including biological supports), with single/dual functionality, and new instrumentation for selected properties/systems, namely for ionic liquids, nanomaterials/nanofluids and high temperature melts.

Its actual scientific activity covers the field of nanomaterials, ionic liquids, and their Ionanofluidos, including new heat and storage fluids and spectral selective absorption paints with industrial impact in the area of energy and the environment, applying previous knowledge to the measurement of properties at the nanoscale and ionic liquids, and the use of ionic liquids as solvating and reaction media to synthesize

and functionalize nanomaterials. Understanding the specific intermolecular forces between nanomaterials and ionic liquids, explaining the significant increase of the properties of the IoNanofluids relative to the base fluid is a challenge to the accuracy of the physical chemistry and molecular theories of heat transfer.

Areas of Expertise

- Chemical Physics of Gases and Liquids, including molecular theories of transport phenomena
- Thermophysics of Materials, including nanomaterials, molten salts, ionic liquids, IoNanofluids and refrigerants
- Metrology
- Instrumentation Science
- Model fluid heat transfer units, mainly for solar energy applications

Major Achievements

- 1977, first apparatus THW technique thermal conductivity of liquids (0.5%) ever built.
- 1978, Taylor dispersion method for mass diffusion measurements.
- 1981, Member of the IUPAC Subcommittee on Transport Properties of Fluids.
- 1986, cryogenic and medium temperature thermal conductivity instrument.
- 1992, high pressure quartz crystal viscometer.
- Work on the electrical and thermophysical properties of environmentally acceptable refrigerants.
- Thermal conductivity measurements/prediction, at wide ranges of temperature and pressure – considered one of world leading scientists.
- Work at NIST (USA), Boulder Laboratories, since 1981.
- Creation of ICAT- FCUL and its LME - Laboratory for Metrology and Testing (1989) - calibration of thermophysical instruments. Pioneer in Portugal of Metrology of Thermophysical Properties.
- 2005 Stimulus for Excellence in Research Award of the Portuguese Research Council (FCT).
- 2005 IUPAC Fellow.
- Founder Centre for Materials Science and Technology 1994 and Centre for Molecular Sciences and Materials 1998, merged in 2015 in CQE.
- Conception new laboratories of building C8 of FCUL (1997).
- Founder of one spin-off company.
- About 450 scientific and pedagogical publications including 40 books and book chapters and 550 conference presentations.

4) Relevant Institutional Roles, Membership on Scientific, Advisory, Editorial or Evaluation Boards

- Head of Scientific Council, FCUL (1990-1993)
- Scientific Coordinator CCMM-FCUL (1998-2001; 2005-2014)
- Vice-President of Centro de Química Estrutural-UL. Coordinator of Thematic Line Thermodynamics of Fluids and Nanosystems (2015-2019)
- Head of Department, Chemistry and Biochemistry FCUL (1997-2001; 2010-2011)
- President of Learning Centre of FCUL in Autonomous Region of Madeira (1990-1993)
- Vice-President and Administrator Board (2001-5/2004) - Portuguese Institute for Quality
- Evaluator Chemical Processes – Portuguese University Foundation FUP (2001-2003)
- Evaluator Chemistry and Chemical Engineering, Centre for Quality Assessment in Higher Education, Republic of Lithuania (2013-2014)
- High Level Expert Group Program Measurements and Testing, 5^o PQ/EU (2002-2003)
- National Delegate Management Committee Program Measurements and Testing, 3^o FP/EU (1991-1994), and Regulatory Committee Program Standards, Measurements and Testing, 4^o FP/EU (1994-1998)
- National Delegate COST-Chemistry and Molecular Sciences and Technologies domain (2013). Evaluator.
- National Delegate to COST Review Panel – Natural Sciences (2015-2021)
- Evaluator of Research Projects and Grants (FCT, ADI, PEDIP, POE), Program Measurements and Testing (1991-1994), Chairman of Physical Measurements (1992), Program NEST - EC (2003), Call FP7-ENERGY-2011-2 (2011), NRC Canada, NSF USA, Res Found Cyprus (2012), Czech-Norwegian Research Programme

(CZ09) (2014), FCT-Researcher (2013), Executive Agency for Higher Education, Research, Development and Innovation Funding (Romania) (2019,2021,2022), ERC 2019 Starting, Consolidator, Advanced and Synergy Grant Calls.

- Auditor (Metrology and Testing) to COFRAC, France (2016-2017); 2022
- Editorial Board International Journal of Thermophysics (1991-2019) and Journal of Nanofluids (2012-)
- Associate Editor of International Journal of Thermophysics (2015-2019)
- Associate Editor of Journal of Chemical and Engineering data (2021-2024)
- Sub-Committee on Transport Properties of Fluids da IUPAC (1981-2001)
- IUPAC Commission on Thermodynamics (1989-97)
- International Association for Transport Properties (2001-...)
- Member of Sociedade Portuguesa de Química
- Member of Royal Society of Chemistry (until 2019)
- Member of American Chemical Society
- Member of American Society of Thermal and Fluid Engineers
- Evaluator da A3ES na área de Química, Química Tecnológica e Engenharia Química - Agência de Avaliação e Acreditação do Ensino Superior

5) Project Direction and Participation

- 1) 1979 - Diretor Científico do Projeto "Accurate Measurements of the Thermal Conductivity of Fluids in the Temperature Range 77- 450 K" - NATO Research Grant 1874.
- 2) 1980 - Diretor Científico do Projeto "Propriedades Superficiais e de Transporte de Misturas de Hidrocarbonetos" - Contrato JNICT 223.80.54.
- 3) 1985 - Diretor Científico do Projeto "Condutibilidade Térmica de Fluidos" e do Projeto "Transporte de Momento e Massa em Fluidos" do Centro de Química Estrutural, INIC.
- 4) 1985 - Diretor Científico do Projeto "Thermal Conductivity of Electrically Conducting Liquids" -NATO Research Grant, RG- 85/0311.
- 5) 1988 - Diretor Científico do Projeto "Propriedades Termofísicas de Produtos Resinosos e seus Derivados" do Centro de Química Estrutural, INIC - Contrato JNICT - 87328 - Colaboração com o LNETI, IPF e CPQUTL.
- 6) 1989 - Diretor Científico do Projeto "Propriedades Termofísicas de Refrigerantes Alternativos", do Centro de Química Estrutural, Contrato INIC 89/EXA-11.
- 7) 1989 - Encarregue pelo Bureau Communautaire de Reference (BCR-CEE) do estudo de viabilidade do Projeto "Thermal Conductivity of High Temperature Melts - Contrato 3314/1/0/154/89/8-BCR-PT(30) através do Instituto de Ciência Aplicada e Tecnologia da FCUL.
- 8) 1990 - Diretor Científico do Projeto "Propriedades Termofísicas de Refrigerantes Ambientalmente Aceitáveis", do Instituto de Ciencia Aplicada e Tecnologia da FCUL, Contrato PMCT/C/CEN/641/90.
- 9) 1991 - Diretor do Laboratório de Metrologia e Ensaio do Instituto de Ciência Aplicada e Tecnologia da FCUL, financiado pelo PEDIP - 6. Projeto PEDIP I/ICAT (PEDIP 6)
- 10) 1991 - Diretor do Projeto do BCR/CEE "Thermal Conductivity of High Temperature Liquids", de colaboração com o Imperial College de Londres, o Van der Waals Laboratorium de Amsterdão, o LIMHP - CNRS de Paris e a Universidade de Salónica - Contrato CEE 3432/1/0/154/91/5-BCR-PT(30)
- 11) 1992 - Diretor Científico do Projeto "Termofísica de Novos Refrigerantes Ambientalmente Aceitáveis", do Instituto de Ciência Aplicada e Tecnologia da FCUL, Contrato PEAM/C/APR/136/91.
- 12) 1992 - Diretor Científico do Projeto "Propriedades de Transporte de Fundidos a Alta Temperatura", do Instituto de Ciência Aplicada e Tecnologia da FCUL, Contrato STRDA/C/CTM/666/92.
- 13) 1992 - Diretor Científico do Projeto "Estudo e caracterização de Polímeros por Espectroscopia de Correlação Fotónica", do Instituto de Ciência Aplicada e Tecnologia da FCUL, Contrato STRDA/P/CEN/547/92.
- 14) 1993 - Diretor Científico do Projeto do BCR/CEE "Thermal Conductivity of High Temperature Melts", do Instituto de Ciencia Aplicada e Tecnologia da FCUL, de colaboração com o Imperial College de Londres, o Van der Waals Laboratorium de Amsterdão, e a Universidade de Salónica. - Contrato MAT1-930028
- 15) 1994 - Entrada em funcionamento do Laboratório de Metrologia e Ensaio do ICAT.
- 16) 1994 - Diretor Científico do Projeto "Medida da Condutibilidade e Difusividade Térmica e da Difusão de Fluidos" - Acção de Cooperação JNICT/INIDA, com o Institut für Thermodynamik, Fachbereich Maschinenbau, Universität der Bundeswehr, Hamburg, RFA.

- 17) 1994 - 1998 Diretor Científico do Projeto Estratégico do CITECMAT, Financiamento Plurianual UI141.
- 18) 1995 - Diretor Científico do Projeto "Desenvolvimento de novos processos de separação e reacção e de métodos associados de medida e previsão de propriedades de equilíbrio e de transporte", parte ICAT - com LSR-FEUP e FCT-UNL - PRAXIS 2/2.1/QUI/07/94.
- 19) 1995 - Laboratório de Metrologia e Ensaios do Instituto de Ciência Aplicada e Tecnologia da FCUL – Consolidação. Projeto PEDIP II / ICAT
- 20) 1996 - Diretor Científico do Projeto "Estudo da Dinâmica de Poliestirenos Isotáticos de Massa Molecular Reduzida. Relação com a Estrutura Primária e Secundária" - Acção Integrada Luso-Alemã, com o Max-Planck Institut für Polymerforschung, Max-Planck Gesellschaft der Wiessenschaften e.V., Mainz, RFA.
- 21) 1996 - Diretor Científico do Projeto "Estudo do Impacto da Investigação em Fenómenos Dependentes da Gravidade nas Ciências e Tecnologias Aeroespaciais em Portugal" do ICAT com IBTQA - INETI e Companhia Espacial Portuguesa - PRAXIS 3/3.1/CTA/1921.95
- 22) 1997 - Diretor Científico do Projeto "Condutibilidade e Difusividade Térmica de Fluidos. Medição Experimental e Interpretação Molecular" - PRAXIS PCEX/P/FIS/19/96
- 23) 1997 - Diretor Científico do Projeto "Estrutura e Termofísica de Halocarbonetos Ambientalmente Aceitáveis" com Universidade dos Açores e IST/UTL- PRAXIS PCEX/P/FIS/34/96
- 24) 1997 – Diretor Científico do Projeto "Workshop on Needs for Improvement of the Measurement Infrastructure in Italy, Ireland, Portugal and Spain", com o State Laboratory, Dublin, Irlanda, o Ente per le Nuove Tecnologie, l'Energia e l'Ambiente, Roma, Itália, e a Universidade de Córdoba, Córdoba, Espanha – Contrato SMT4-CT97-6525.
- 25) 1997 - Diretor Científico da parte CITECMAT do Projeto "Condutibilidade Térmica pelo Método de Laser Flash", em colaboração com o Departamento de Física do IST - PRAXIS PCEX/P/FIS/11/96.
- 26) 1997 - Adviser do Projeto "Establishment of Traceability of electrolytic conductivity", Dirigido pelo Danish Institute of Fundamental Metrology - Contrato SMT-PL96-2318.
- 27) 1998 – Coordenador da participação Portuguesa no Projeto "Information System and Qualifying Criteria for Proficiency Testing Schemes", dirigido pelo BAM, Bundesanstalt für Materialforschung und-prüfung, Alemanha, e com a participação de 16 países Europeus, contrato SMT4-CT98-8002.
- 28) 1999 - Diretor Científico do Projeto "Propriedades Termofísicas de Metais Fundidos – Medição, Correlação e Interpretação", contrato PRAXIS/P/CTM/12120/98. Continuado POCTI/CTM/12120/1998.
- 29) 1999 – Participante no Projeto "Interactions in solutions for model solids with biological interest. Correlations and property interpretation", contrato PRAXIS XXI – P/QUI/14265/98.
- 30) 1999 – 2000 - Diretor Científico do Projeto Estratégico do Centro de Ciências Moleculares e Materiais, Financiamento Plurianual UI536
- 31) 2001 – Nomeado Vice-Presidente do Instituto Português da Qualidade e Responsável pelo Laboratório Central de Metrologia – Orientação Científica dos novos Projetos de desenvolvimento do Laboratório nas áreas da Química-Física e da Termofísica.
- 32) 2001 – Responsável da área de Metrologia do Instituto Português da Qualidade, envolvendo Projetos na área dos padrões nacionais, rastreabilidade das medições, incerteza de medições, implementação de sistemas de gestão da qualidade nos laboratórios nacionais de metrologia (ISO EN NP 17025), metrologia legal – controlo metrológico.
- 33) 2002 – Coordenador da WP5 – Standardization Rede Temática Europeia METROPOLIS – Metrology in Support of Precautionary Sciences and Sustainable Development Policies, Contract G6RT-C-2002-05095.
- 34) 2003 – Co-Responsável no Conselho Executivo da EUROMET da Investigação em Metrologia no Espaço Europeu – MERA.
- 35) 2003 – Responsável do grupo português no Projeto europeu - Projeto nº NNE5-2001-00473 intitulado "Advanced Adiabatic Compressed Air Energy Storage", WP4 – Thermophysical Properties of Humid Air.
- 36) 2005 – 2010 - Diretor Científico do Projeto Estratégico do Centro de Ciências Moleculares e Materiais, Financiamento Plurianual UI536
- 37) 2008 - Diretor Científico do Projeto PTDC/QUI/66826/2006 -"Síntese e Caracterização de Líquidos Iónicos".
- 38) 2008 - Diretor Científico da Parte Portuguesa - ProBio-HySens - "Process gas analysis for bio and hydrogen gas mixtures using new high pressure in Situ sensors", Grant agreement nº FP7-SME-2007-1-222021.

- 39) 2009 - Participante na equipa do Projeto PTDC/QUI-QUI/101187/2008 - Complexos de Ruténio para aplicação anti-tumoral.
- 40) 2010 - Diretor Científico do Projeto PTDC/EQU-FTT/104614/2008 - Ionanofluidos como novos fluidos de transferência de calor. Estrutura, propriedades e aplicações
- 41) 2010 - Diretor Científico da Parte Portuguesa - Gas-Pro-Bio Waste - "Universal Gasification Process Analyser for Bio Mass and Organic Waste Treatment", Grant Agreement nº FP7-SME-2010-1-261911.
- 42) 2011 - Diretor da Parte Portuguesa – “NARILAR - New Working Fluids based on Natural Refrigerants and Ionic Liquids for Absorption Refrigeration”, FP7-PEOPLE-2010-PIRSES-269321
- 43) 2011 – 2013 - Diretor do Projeto Estratégico PEst-OE/QUI/UI0536/2011 do Centro de Ciências Moleculares e Materiais
- 44) 2014 - Diretor do Projeto Estratégico PEst-OE/QUI/UI0536/2014 do Centro de Ciências Moleculares e Materiais
- 45) 2014 – 2017 - Membro do Comité de Gestão da acção COST CM1206 – EXIL – Exchange in Ionic Liquids
- 46) 2014 - R&D Agreement FCUL/BASF on Natural Nanomaterials – Melanin for solar thermal energy - work package 1 - patent filled
- 47) 2014 – Membro do Projeto EIT-KIC/IVE/0051/2013 - LisbonLiving+: Estratégias inovadoras para uma vida saudável e um envelhecimento activo na Região de Lisboa da Universidade de Lisboa
- 48) 2015 – 2019 - Diretor do Projeto Estratégico UID/QUI/00100/2013 do Centro de Química Estrutural, pólo de Ciências
- 49) 2016 – 2019 - Membro do Comité de Gestão da Acção COST CA15119 – NANOUP TAKE - Overcoming Barriers to Nanofluids Market Uptake (2016-2019)
- 50) 2018 – Co-Investigador Responsável do Projeto ILGERANTS (LISBOA-01-0145-FEDER-032066) - Novas Misturas para Refrigeração por Absorção baseados em Líquidos Iónicos
- 51) 2019 – Participante na equipa do projeto Fundo Azul (FA_06_2017_040) - Nem tudo o que vem à rede é peixe – Quantificar e minimizar o impacto das redes fantasma na costa Portuguesa
- 52) 2020 – Membro do CORE group da NANOconVEX - COST INNOVATION GRANT CIG-15119 – Nanofluids for convective heat transfer devices”.
- 53) 2021 – Membro do Projeto NEWS4CSP_2022.05021.PTDC - New materials approaches for concentrating solar power (CSP): Molten salts and Corrosion Protection

6) Honours

- 1) 2nd Phillips Award for Young Researchers (1970).
- 2) Elected Member do Subcommittee on Transport Properties da International Union of Pure and Applied Chemistry - 1981-2001.
- 3) Elected Associate Member - IUPAC Commission on Thermodynamics (I.2) - 1989-1997.
- 4) Elected "Fellow" - International Thermal Conductivity Conferences - 1989.
- 5) Elected Chairman of the European Thermophysical Properties Conferences (1990)
- 6) Cited in Who's Who in the World, 12 Ed. (1995), p 1010.
- 7) Elected Member - Royal Society of Chemistry (2001).
- 8) Founder Member of International Association for Transport Properties (2001)
- 9) Elected Member Executive Committee - EUROMET (2003).
- 10) Elected Senior Member - Ordem dos Engenheiros (2004).
- 11) Stimulus to Excellence in Research Award, FCT-MCTES, Portugal (2005).
- 12) Elected IUPAC Fellow (2005).
- 13) Invited Member of Editorial Board - International Journal of Thermophysics and Journal of Nanofluids.
- 14) Selected Project - IOBIOFLUIDS Act by COTEC Portugal (COHiTEC) -Turning knowledge into social and economic value (2011)
- 15) Nominated National Delegate to Domain Committee on Chemistry and Molecular Sciences European Program COST (2013)
- 16) Nominated National Delegate to COST Review Panel (Natural Sciences) (2015-2021)
- 17) Reviewer of many International journals and books, in the areas of Physical Chemistry, Thermodynamics, Chemical Engineering, Heat Transfer, Nanoscience and Technology.
- 18) One of world's most cited top scientists in Chemical Engineering (top 2%). Stanford University Ranking, US, 2020, 2021
- 19) Nominated Associate Editor, Journal of Chemical and Engineering Data (American Chemical Society (2021-)

20) Elected Fellow – International Association for Advance Materials (IAAM) – (2022-2025)

7) List of Prototypes (2008-2019)

- 1) Prototype - A new instrument for the measurement of vapour-liquid Equilibria, using the flow method (Ana Cristino, Carlos Nieto de Castro, António Palavra).
- 2) Prototype - New instrument for the measurement of the thermal conductivity of gaseous mixtures under “in situ” harsh conditions up to 200°C and 20 bar (Deliverable of PRO-Bio-Hy Sens) (Salomé Vieira, Maria José Lourenço, João Serra, Carlos Nieto de Castro).
- 3) Prototype - New heat capacity sensor for gaseous mixtures under “in situ” harsh conditions up to 200°C and 20 MPa (Deliverable of PRO-Bio-Hy Sens) (Salomé Vieira, Maria José Lourenço, João Serra, Carlos Nieto de Castro).
- 4) Prototype - New thermal conductivity sensor for gaseous mixtures under “in situ” harsh conditions, for very high temperatures –up to 800°C and 5 MPa (Deliverable of GAS-PRO-BIO-Waste) (Carla Queirós, Maria José Lourenço, João Serra, Carlos Nieto de Castro).
- 5) Prototype - New heat capacity sensor for gaseous mixtures under “in situ” harsh conditions, for very high temperatures –up to 800°C and 5 MPa (Deliverable of GAS-PRO-BIO-Waste) (Carla Queirós, Maria José Lourenço, João Serra, Carlos Nieto de Castro).
- 6) Prototype - New Capacitance Sensor (Electrical Permittivity) sensor for gaseous mixtures under “in situ” harsh conditions, for very high temperatures –up to 800°C and 5 MPa (Deliverable of GAS-PRO-BIO-Waste) (Carla Queirós, Fernando Santos, Maria José Lourenço, João Serra, Carlos Nieto de Castro).
- 7) Prototype - New instrument to measure the thermal conductivity of ionic liquids based on the transient-hot strip sensor. It includes specially designed sensors and measuring cells. (Maria João Figueiredo, Ana Paula Ribeiro, Maria José Lourenço, Carlos Nieto de Castro).
- 8) Prototype - New cells for the measurement of the electrical conductivity of ionic liquids (Maria João Figueiredo, Fernando Santos, Maria José Lourenço, João Serra).
- 9) Prototype - New instruments (2) for the measurement of the electrical permittivity of pure liquids and binary solutions. (Angela Santos, Maria Isabel Lampreia, Fernando Santos, Carlos Nieto de Castro).
- 10) Prototype - New transient hot-wire thermal conductivity instrument for the measurement of humid air and corrosive gases and liquids at moderate temperatures and pressures (Susete Beirão, Maria José Lourenço, Carlos Nieto de Castro).
- 11) Prototype – Pilot unit for solar energy absorbance measurement with selective paints based on natural nanomaterials (Salomé Vieira, Maria José Lourenço, Carlos Nieto de Castro)
- 12) Prototype - Pilot unit for the determination of heat transfer coefficients in parallel plate, shell and tube and concentric cylinder exchangers (Manuel Matos Lopes, Sohel Murshed, Carlos Nieto de Castro).
- 13) Prototype - A new instrument to measure the thermal conductivity of ionic liquids based on a transient hot-wire probe. New cells and pressure vessel (Salomé Vieira, Carla Queirós, Maria José Lourenço, Carlos Nieto de Castro).

8) PhD Supervisions

- 1986 - João Manuel Nunes Alvarinhas Fareleira - Propriedades Termofísicas de Hidrocarbonetos - co-supervision with Jorge Carreira Gonçalves Calado.
- 1988 - Umesh Vinaica Mardolcar - Condutibilidade Térmica de Moléculas Simples entre 100 e 450 K até 10 MPa.
- 1992 - Maria de Lurdes Vicente Ramires - Medida Experimental de Condutibilidade Térmica de Líquidos Condutores pelo Método do Fio Aquecido em Regime Transiente.
- 1992 - Manuel Luis de Matos Lopes - Difusividade de Misturas Líquidas Binárias Junto à Temperatura Crítica de Mistura com a Técnica de Dispersão de Taylor.
- 1993 - Fernando José Vieira dos Santos - Determinação Experimental da Viscosidade de Fluidos a Alta Pressão pelo Método do Cristal de Quartzo em Vibração Torsional.
- 1993 - Paulo João de Lemos Cabral de Sousa Fialho - Propriedades Termofísicas de Fluidos - Sua Previsão, Estimativa e Correlação.

- 1994 - Ana Cristina Tavares Sousa - Densidade e Viscosidade em Sistemas Homogéneos.
- 1996 - Maria Teresa Gamito Barão - Propriedades Dielétricas de Refrigerantes Ambientalmente Aceitáveis – co-supervision with Umesh Vinaica Mardolcar.
- 1996 - Anélia Nikolaeva Gurova - Condutibilidade Térmica de Refrigerantes Ambientalmente Aceitáveis - co-supervision with Umesh Vinaica Mardolcar.
- 1998 - Magda Branquinho de Oliveira Sampaio – Propriedades Térmicas de Produtos Resinosos.
- 1998 - Maria José Vitoriano Lourenço – Novo Método para a Medição Rigorosa da Condutibilidade Térmica de Materiais Fundidos a Alta Temperatura – co-orientação com Maria de Lurdes Vicente Ramires.
- 2004 – Nuno Jorge Rosa Lopes Galamba – Propriedades Termofísicas de Refrigerantes Ambientalmente Aceitáveis e de Sais Fundidos – Previsão, Simulação e Correlação – co-orientação com James Ely (Colorado School of Mines, EUA).
- 2007 – Valentim Maria Brunheta Nunes – Viscosidade de Sais Fundidos em Função da Temperatura. Medição Experimental e Interpretação.
- 2008 – Suzete Garcia Soares Beirão - Condutibilidade Térmica de Fluidos em Gamas Alargadas de Temperatura e Pressão - co-supervision with Maria de Lurdes Vicente Ramires.
- 2012 - Ana Paula da Costa Ribeiro – Structure and Thermal and Electrical Properties of Carbon Nanotubes and Nanofluids in Ionic Liquids – co-supervision with Maria José Vitoriano Lourenço.
- 2014 - Ana Filipa Russo de Albuquerque Cristino - High Temperature Vapour-Liquid Equilibria of Water-Polyalcohol mixtures - co-supervision with António Palavra (IST).
- 2016 - Salomé Inês Cardoso Gomes Vieira - Estudo da utilização de nanomateriais e líquidos iónicos como pigmentos para o desenvolvimento de novos dispositivos captadores e conversores de energia solar – co-supervision with Maria José Vitoriano Lourenço.
- 2017 - João Manuel Pedro Moisão França - Solid-liquid Interactions in Ionanofluids. Experiments and molecular simulation – co-supervision with Prof. Agílio Alexandre Henriques Pádua, da Universidade Blaise Pascal, Clermond-Férrand, França.
- On Going - Luís Carlos Silvestre Nobre - Production of Micro and Nanocatalysts by Supercritical Antisolvent Precipitation (SAS) - co-supervision with Doutor Mário José Ferreira Calvete da Universidade de Coimbra and Doutora Maria Beatriz Pinto Pereira Palma Nobre, do Instituto Superior Técnico, Ulisboa

9) MSc Supervisions

- 1997 - Valentim Maria Brunheta Nunes - Construção e ensaio de um viscosímetro de copo oscilante para materiais fundidos a altas temperaturas. Mestrado em Química-Física (Materiais)
- 2007 – Ana Paula da Costa Ribeiro - Estrutura e Propriedades Dielétricas de Halocarbonetos Aceitáveis. Mestrado em Química-Física (Materiais)
- 2008 – Salomé Inês Cardoso Gomes Vieira - Funcionalização de Nanomateriais para aplicações em Conversão Térmica de Energia Solar. Mestrado em Química Tecnológica
- 2008 - David Dionísio Severino Rodrigues - As Colagens na Reabilitação do Património Edificado. Metodologia para a Avaliação e Selecção de Colas Usadas para a Recuperação de Estruturas Antigas de Madeira – co-orientação com Dr^a Maria Paula Rodrigues (NMO/LNEC). Mestrado em Química Aplicada ao Património Cultural
- 2010 – João Manuel Pedro Moisão França - Propriedades Térmicas de Ionanofluidos. Mestrado em Química Tecnológica
- 2010 – Odília Maria Ferreira Fernandes Luís – Estudo e Optimização do Processo de Tratamento da ETARI da Empresa de Cervejas da Madeira – co-orientação com Prof. José Carlos Antunes Marques (Centro de Ciências Exactas e de Engenharia da Universidade da Madeira). Mestrado em Química Tecnológica
- 2011 - Mário Rui Costa Soromenho - Síntese, Purificação e Caracterização Físico-Química de Líquidos Iónicos Derivados do Ião Colínio - co-orientação com Prof. Luís Paulo Rebelo (ITQB-UNL). Mestrado em Química.
- 2013 – Simão Gustavo Rosa Quaresma de Abreu - Avaliação da viabilidade de produção de um reagente auxiliar envolvido no processo de fabrico de um API - co-orientação com Doutora Dália Maria Dias Barbosa, CIPAN. Mestrado em Química Tecnológica

- 2013 - Elena Niculita - Desenvolvimento de Componentes Verdes para Espumas de Poliuretano de um Componente com Baixo Conteúdo monomérico – co – orientação com Doutor Moisés Luzia Pinto, Greenseal Research. Mestrado em Química Tecnológica.
- 2014 - Marta Alexandra Nabais dos Santos - Caracterização de acabamentos utilizados na produção de fibras sintéticas e correlação com as suas propriedades – co-orientação com Eng^a Carla Santos, Fisipe. Mestrado em Química Tecnológica.
- 2015 - Francisco Eduardo Berger Bioucas - Análise e previsão de parâmetros processuais no processo de transesterificação da Prio Biocombustíveis –co-orientação com Eng^a Anabela Antunes, Prio Biocombustíveis. Mestrado em Química Tecnológica.
- 2015 - Lénia Marreiros Calado - Desenvolvimento de Compósitos Poliméricos: Estudo da Sua Reologia e Extrusão – co-orientação Eng^a Fernando Cruz, CABOPOL Polymer Compounds, S.A. Mestrado em Química Tecnológica.
- 2015 – Mário Filipe Lima do Vale - Lignopolyol based one-component polyurethane foams – co-orientação Doutora Maria Margarida Mateus, Greenseal Research. Mestrado em Química Tecnológica.
- 2016 – André Carreira - Estudo da influência de diferentes parâmetros na formação do filme protetor no aço carbono API 5L X-65 – Co-orientação com Dr^a Ana Marisa Pereira, Instituto de Soldadura e Qualidade. Mestrado em Química Tecnológica.
- 2018 - Bruno Joaquim Henriques - Estudo das transferências de calor nos granizados Sumol – Co-orientação com Prof^a Maria José Lourenço e Dra. Maria João Alegria, SUMOL-COMPAL. Mestrado em Química Tecnológica.
- 2019 - Gonçalo Manuel Monteiro Gonçalves - Desenvolvimento, implementação e validação de um método de geração de misturas de partículas de referência para a calibração de contadores de partículas óticos, Co-orientação com Eng^a Tânia Marisa Ramalho Farinha, Instituto de Soldadura e Qualidade. Mestrado em Química Tecnológica.

10) Post-Doc Supervisions

- 1998–2001 – Rahool S. Pai-Panandiker - Estrutura e Termofísica de Refrigerantes Ambientalmente Aceitáveis.
- 1999–2000 – Madelaine Ribeiro - Estrutura e Propriedades Termofísicas de Materiais Poliméricos.
- 2002–2005 – Rahool S. Pai-Panandiker – Thermal Conduction in Molten Materials – co-orientação com Maria José Vitoriano Lourenço.
- 2005–2007 – Nuno Jorge Rosa Lopes Galamba – Development of Interionic Potentials for the Molecular Simulation of Equilibrium and Transport Properties of Molten Salts – co-orientação com Benedito Cabral
- 2008–2010 – Elisa Langa Morales – Thermophysical Properties and Structure of Ionic Liquids and Terpenic Mixtures – co-supervision with António Palavra (IST)
- 2010–2015 – Sohel S.M. Murshed - Nanomaterials, Ionic Liquids and Nanofluids – Programa CIÊNCIA 2008
- 2015-2018 - Sohel S.M. Murshed - Flow and Heat Transfer of Nanofluids and IoNanofluids in Microchannels
- 2015-2019 - Xavier Paredes Mendéz - New Generation Heat Transfer Fluids based on IoNanofluids. Structure, Properties and Process Requirements
- 2015-2019 - Ana Filipa Russo de Albuquerque Cristino - Estudo do equilíbrio de fases de sistemas binários e ternários, contendo água, líquidos iónicos e álcoois a temperaturas elevadas.

11) Publication List

THESIS & Complementary Monography

C.A. Nieto de Castro, “Medida da Condutibilidade Térmica de Hidrocarbonetos Líquidos pelo Método do Fio Aquecido*“, Thesis submitted to the Degree “Doctor in Engineering Sciences (Chemical Thermodynamics), Instituto Superior Técnico, Universidade Técnica de Lisboa, July 1977.

* In English: Measurement of the Thermal Conductivity of Liquid Hydrocarbons Using the Transient Hot-Wire Method

C.A. Nieto de Castro, "Métodos Experimentais de Medida de Coeficientes de Difusão em Misturas Líquidas Binárias – Revisão Crítica*", Complementary Work for the obtention of the Degree "Doctor in Engineering Sciences (Chemical Thermodynamics), Instituto Superior Técnico, Universidade Técnica de Lisboa, October 1977.

* In English: Experimental Methods for the Measurement of Diffusion Coefficients in Binary Liquid Mixtures

CONFIDENTIAL SCIENTIFIC REPORTS

C.A.N. de Castro, P.G. Moseley, W.A. Wakeham, "Design of an Apparatus for the Measurement of Chloride Ion Diffusivities", 1978, Contract for Research and Development Department, Mond Division, Imperial Chemical Industries, Runcorn, Cheshire

C.A.N. de Castro, S. Kalicinski, W.A. Wakeham, "Self Diffusion Coefficients in Sodium Chloride-Sodium Hydroxide Water Mixtures", 1978, Contract for Research and Development Department, Mond Division, Imperial Chemical Industries, Runcorn, Cheshire

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Klemens Massonne (BASF), Salomé Vieira (FCUL), Maria José Lourenço (FCUL), Carlos Nieto de Castro (FCUL), "Use of Melanin or Melanin Particles for Solar Thermal Energy Conversion", EPO 17162599.9 – 1375, Date of Filing:23:03:2017. Priority EP/30.03.2016/EPA 16162925 (Comunicação EPO 19:06:2017. Right to European Patent 10:05:2016). Patent Number EP 3 228 192 A2, published 11.10.2017, Bulletin 2017/41. Patent Number EP 3 228 192 A3, published 17.01.2018, Bulletin 2018/03.

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1. 13th European Conference on Thermophysical Properties, C. A. Nieto de Castro, ed., Pion Ltd, London, (1995), 826 pp., ISBN – 0 85086 164 0.
2. Transport Properties of Fluids - Their Correlation, Prediction and Estimation", J. Millat, J. H. Dymond, C. A. Nieto de Castro, eds., Cambridge University Press, London, (1996), 483 pp., ISBN – 0521 46178 2.
3. Guia do Laboratório de Química e Bioquímica, José A. Martinho Simões Miguel A. R. Botas Castanho, Isabel M. S. Lampreia, Fernando J. V. Santos, Carlos A. Nieto de Castro, M. Fátima

- Norberto, M. Teresa Pamplona, Lurdes Mira, M. Margarida Meireles, Ed. LIDEL, Lisboa (2000), 166 pp., ISBN – 972-757-146-8
4. Metrologia - em Síntese, Tradução Portuguesa de “Metrology in Short”, M. Seabra, E. Filipe, C. A. Nieto de Castro, edição IPQ, (2001), 63 pp., ISBN –972-763-041-3
 5. O Sector Química e Plásticos em Portugal, Ana Cláudia Valente (Coordenadora), Carlos Nieto de Castro, José Bonfim, Mário Sequeira, Joaquim Russinho, Miguel Syder, Vítor Vitorino e Maria de Fátima Morais, INOFOR, Lisboa, Coleção Estudos Sectoriais 23, (2004), pp. 176. ISBN 972-8619-39-1
 6. Transport Properties of Fluids - Their Correlation, Prediction and Estimation, J. Millat, J. H. Dymond, C. A. Nieto de Castro, eds., Cambridge University Press, London, (2005), 500 pp., Paperback (ISBN-13: 9780521022903 | ISBN-10: 0521022908). DOI: <https://doi.org/10.1017/cbo9780511529603>
 7. Guia do Laboratório de Química e Bioquímica, José A. Martinho Simões Miguel A. R. Botas Castanho, Isabel M. S. Lampreia, Fernando J. V. Santos, Carlos A. Nieto de Castro, M. Fátima Norberto, M. Teresa Pamplona, Lurdes Mira, M. Margarida Meireles, 2ª Ed. LIDEL, Lisboa (2008), 203 pp., ISBN – 978-972-757-487-2
 8. Notas Químicas – Borodin Compositor e Químico”, Maria José Lourenço, Filipe Pinto-Ribeiro, Ana Maria Eiró, César Viana, Christine Wassermann Beirão, Fernando Brito Palma, Manuel Rosa Nunes, Fernanda Madalena Costa, Marília Peres, Virgílio Meira Soares, Carlos Nieto de Castro, International Year of Chemistry, Edição FCUL, Lisboa, Julho 2011, 24 pp. ISBN: 978-972-96653-3-2
 9. Ionic Liquids. Seeds for New Engineering Applications”, Book of Abstracts, Workshop WILS2012, Carlos Nieto de Castro, S M Sohel Murshed, Maria José Lourenço e Fernando J V Santos, Eds. Edição FCUL, (2012), pp 162. ISBN: 978-972-9348-20-4
 10. Nanofluids: Synthesis, Properties and Applications, S. M. Sohel Murshed, C. A. Nieto de Castro, Eds., NOVA Science Publishers, Inc., New York, (2014), ISBN 978-1-63321-677-8. <https://novapublishers.com/shop/nanofluids-synthesis-properties-and-applications/> .
 11. Guia do Laboratório de Química e Bioquímica, José A. Martinho Simões Miguel A. R. Botas Castanho, Isabel M. S. Lampreia, Fernando J. V. Santos, Carlos A. Nieto de Castro, M. Teresa Pamplona, Manuel E. Minas da Piedade, 3ª Ed. LIDEL, Lisboa (2017), 178 pp., ISBN 978-989-752-208-6. <http://www.lidel.pt/pt/catalogo/ciencias-fundamentais/bioquimica/guia-do-laboratorio-de-quimica-e-bioquimica-2-2/>.
 12. 1st European Symposium on Nanofluids, Abstracts Collection - ESNf2017”, S M Sohel Murshed, Carlos Nieto de Castro, José Enrique Julia, Eds., Edição FCUL, (2017), pp 284: ISBN 978-972-96653-5-6.

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14. 1st International Conference on Nanofluids (ICNf2019), 2nd European Symposium on Nanofluids (ESNf2019), 26-28 June 2019 in Castelló (Spain), organized by Nanouptake Action (CA15119). Conference Proceedings: <http://dx.doi.org/10.6035/CA15119.03> .

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16. C. A. Nieto de Castro - "An experimentalist point of view of the hard sphere theories for transport properties", Lectures on Thermodynamics and Statistical Mechanics, eds. A. Gonzalez, C. Varea and M. Medina-Noyola, World Scientific, Singapore, (1989).
17. M. J. Assael, C. A. Nieto de Castro, H. M. Roder and W. A. Wakeham - "Transient Thermal Conductivity Methods", Chapter 7 in "Experimental Chemical Thermodynamics, Volume 2 - Measurement of the Transport Properties of Fluids", W. A. Wakeham, A. Nagashima, J.V. Sengers, Eds., IUPAC, ed. Blackwells (1991), pp 161-194. ISBN 0-0632-02997-8
18. C. A. Nieto de Castro - "Thermal conductivity and thermal diffusivity in supercritical fluids", Chapter 9, in " Supercritical Fluid Technology: Reviews in Modern Theory and Applications", eds. T.J. Bruno and J. F. Ely, CRC Press, Boca Raton, (1991).
19. T. Bruno, C. A. Nieto de Castro, J. F. P. Hamel, A. M. F. Palavra - "Supercritical Fluid Extraction of Biological Products", Chapter 11 in "Recovery Processes for Biological Products", eds. J .F. Kennedy and J. M. S. Cabral, John Wiley & Sons, London, (1993), pp 303-354. ISBN 0-471-93349-X. DOI: <https://doi.org/10.1002/abio.370140303>
20. W. A. Wakeham, C. A. Nieto de Castro, "Technological Importance", Chapter 2 in "Transport Properties of Fluids - Their Correlation, Prediction and Estimation", J. Millat, J. H. Dymond, C. A. Nieto de Castro, eds., Cambridge University Press, London, (1996), pp 6-16. ISBN 0-521-46178-2.
21. C. A. Nieto de Castro, W. A. Wakeham, "Methodology", Chapter 3 in "Transport Properties of Fluids - Their Correlation, Prediction and Estimation", J. Millat, J. H. Dymond, C. A. Nieto de Castro, eds., Cambridge University Press, London, (1996), pp 17-26. ISBN 0-521-46178-2.
22. P. S. Fialho, M. L. V. Ramires, J. M. N. A. Fareleira, C. A. Nieto de Castro, "Reacting Mixtures at Low Density - Alkali Metal Vapours", Chapter 16 in "Transport Properties of Fluids - Their Correlation, Prediction and Estimation", J. Millat, J. H. Dymond, C. A. Nieto de Castro, eds., Cambridge University Press, London, (1996), pp 400-419. ISBN 0-521-46178-2.
23. I. Egly, C.A. Nieto de Castro, "Thermodynamics and Microgravity - What can we learn?", in "Chemical Thermodynamics", IUPAC Chemistry for the 21st Century Monograph, T. M.

Letcher, ed., Blackwells, Oxford (1999), 171-186. ISBN 063051272.
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24. V. M. B. Nunes, M. J. V. Lourenço, F. J. V. Santos, M. M. S. Matos Lopes and C. A. Nieto de Castro, "Accurate Measurements of Physico-Chemical Properties on Ionic Liquids and Molten Salts", in "Ionic Liquids and Molten Salts: Never the Twain", Eds. K. R. Seddon and M. Gaune-Escard, John Wiley & Sons, New York (2010). ISBN: 978-0-471-77392-4. Hardcover. 441 pages. Chapter 17, pp-229-263.
http://eu.wiley.com/WileyCDA/WileyTitle/productCd-0471773921_descCd-tableOfContents.html
25. S. M. S. Murshed, C. A. Nieto de Castro, "Forced Convective Heat Transfer of Nanofluids in Minichannels", Chapter 18 in Two Phase Flow, Phase Change and Numerical Modeling, Ed. Amimul Ahsan, (2011), INTECH, Coatia, ISBN 978-953-307-584-6, pp-419-434. DOI: <https://doi.org/10.5772/24544>
26. A. P. C. Ribeiro, S. I. C. Vieira, J. M. P. França, C. S. Queirós, E. Langa, M. J. V. Lourenço, S. M. S. Murshed, C. A. Nieto de Castro, "Thermal Properties of Ionic Liquids and Ionanofluids", Chapter 2 in Ionic Liquids: Theory, Properties, New Approaches, Edited by Prof. Alexander Kokorin, (2011), Intech, Rijeka, Croatia, ISBN 978-953-307-349-1, pp-37-60. DOI: <https://doi.org/10.5772/13920> . More than 7900 downloads, March 2020, 8577 downloads in Oct 2021. http://cdn.intechopen.com/pdfs/13912/InTech-Thermal_properties_of_ionic_liquids_and_ionanofluids.pdf
27. C. A. Nieto de Castro, S. M. Sohel Murshed, M. J. V. Lourenço, F. J. V. Santos, M. L. Matos Lopes, J. M. P. França, "Ionanofluids – new heat transfer fluids for green process development", Chapter 8 in Green Solvents I: Properties and Applications in Chemistry, A. Mohammad, Inamuddin, (eds.). Springer Science+Business Media Dordrecht Germany 2012, pp 233-249. ISBN 978-94-007-1711-4. DOI: https://doi.org/10.1007/978-94-007-1712-1_8 . https://link.springer.com/chapter/10.1007%2F978-94-007-1712-1_8
28. S. M. S. Murshed, C. A. Nieto de Castro, "Nanofluids as Advanced Coolants", Chapter 14 in Green Solvents I: Properties and Applications in Chemistry, A. Mohammad, Inamuddin, (eds.), Springer Science+Business Media Dordrecht, Germany 2012, pp 397-415. ISBN 978-94-007-1711-4. DOI: https://doi.org/10.1007/978-94-007-1712-1_14 . https://link.springer.com/chapter/10.1007/978-94-007-1712-1_14
29. Carlos Nieto de Castro, Ana P. C. Ribeiro, Salomé I.C. Vieira, João P. M. França, Maria J.V. Lourenço, Fernando V. Santos, Sohel S.M. Murshed, P. Goodrich and C. Hardacre, "Synthesis, Properties and Physical Applications of Ionanofluids", Chapter 7 in Ionic Liquids - New Aspects for the Future. Jun-ichi Kadokawa (Ed), Intech, Rijeka, Croatia, (2013), pp 165-193. ISBN 980-953-307-626-8. <http://dx.doi.org/10.5772/52596>. Full book ISBN: 978-953-51-0937-2, InTech, Available from: <http://www.intechopen.com/books/ionic-liquids-new-aspects-for-the-future/synthesis-properties-and-physical-applications-of-ionanofluids>
30. S. M. Sohel Murshed and C. A. Nieto de Castro, "Thermophysical Properties and Heat Transfer Characteristics of Carbon Nanotubes Dispersed Nanofluids", Chapter 3 in "Nanofluids: Synthesis, Properties and Applications", S. M. Sohel Murshed, C. A. Nieto de Castro, Eds., NOVA Science Publishers, Inc., New York, (2014) pp 53-76. ISBN (978-1-63321-

677-8). <https://novapublishers.com/shop/nanofluids-synthesis-properties-and-applications/>

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32. C. A. Nieto de Castro and S. M. Sohel Murshed, "Progress and Challenges in Nanofluids Research", Chapter 11 in *Nanofluids: Synthesis, Properties and Applications*, S. M. Sohel Murshed, C. A. Nieto de Castro, Eds., NOVA Science Publishers, Inc., New York, (2014), pp 261-277. ISBN (978-1-63321-677-8). <https://novapublishers.com/shop/nanofluids-synthesis-properties-and-applications/>
33. Carlos Nieto de Castro, Xavier Paredes, Salomé Vieira, Sohel Murshed, Maria José Lourenço and Fernando Santos, "IoNanofluids: Innovative Agents for Sustainable Development", in *Nanotechnology for Energy Sustainability*, Volume 3, Part IV, Chapter 37, Eds Baldev Raj, Marcel Van de Voorde, Yashwant Mahajan, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim, (2017), pp 911-936. ISBN: 978-3-527-34014-9. Submitted 15 April 2016. Revised version 3 May. Accepted 4 May. Published April 5, 2017. http://www.wiley-vch.de/en?option=com_eshop&view=product&isbn=9783527340149&title=Nanotechnology%20for%20Energy%20Sustainability
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