TÉCNICO LISBOA

IST-ID
Associação do Instituto Superior Técnico para a Investigação e Desenvolvimento

Mission

Created in 1911, Instituto Superior Tecnico (IST) is the largest and most reputed school of Engineering, Science and Technology and Architecture in Portugal.

Facts and figures about IST can be consulted in http://tecnico.ulisboa.pt/en/about-IST/facts-figures/

The **Association of Instituto Superior Técnico for Research and Development** (IST-ID), created in 2011, is a private not-for-profit institution, which primarily aims at carrying out Science and Technology activities, fostering knowledge transfer and promoting the involvement of national and foreign researchers, internally and externally, in RD&I projects in their areas of expertise. IST-ID carries out RD&I activities in several major areas, which are associated with challenges with a strong impact on society. These are strongly interdisciplinary areas in nature and cut across different fields of engineering, science and technology and architecture. The RD&I activities comprise not only fundamental aspects but also projects with a strong applied component and the areas of intervention are Basic Sciences, Information and Communication Technologies, Energy, Environment and Mobility, Applied Life Sciences, Materials, Nanotechnologies and Nanosciences, Technology Management and Entrepreneurship, Manufacturing Technologies Engineering, Nuclear Reactors and Accelerators, Nuclear Safety and Radiological Protection.

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The team of IST researchers affected to STAGE-STE

The team of IST researchers affected to the STAGE-STE programme is composed by 3 PhDs. The group has a strong background in Materials Science and Engineering. The two more senior members of the team (Luis Guerra Rosa and Jorge C Fernandes) work together since more than 20 years and they have been involved in several projects in the field of materials processing using solar furnaces.

The IST team leader, Luis Guerra Rosa, is Associate Professor, holding since 2004 the academic title of “Agregado” in Materials Science. Previous appointments: Head of Materials Engineering Department (1998-2000; 2004-2008); Director at INETI Dept. of Materials (1993-1995). Prof L Guerra Rosa started his research and teaching career at IST in 1977, after his graduation in metallurgical engineering. In 1986, he obtained the Ph.D. degree in mechanical engineering with a thesis on fatigue crack nucleation and propagation in steels, using fracture-mechanics concepts. In 1988, he created his own research group, changed slightly his research topics, and focused on ceramics and composite materials, including petrous materials, their characterization, and processing. Since then and taking advantage of his earlier experience, Prof L Guerra Rosa has been devoting his time to problems involving structural and technological characterization of materials at different stages of their elaboration, to understand their behaviour, to compare their properties to references and specifications, and to evaluate their performances in condition simulating applications. Till the present date, he authored/co-authored more than 80 technical papers in international scientific periodicals or as chapters in books, and more than 110 papers in proceedings of international conferences and symposia; he edited 5 books of conference proceedings and authored 1 book on development of laminate composites.

URLs: Homepage: https://fenix.ist.utl.pt/homepage/ist11630

Publications: https://sotis.tecnico.ulisboa.pt/sotis-ui/#researcher/ist11630

Publications in ResearcherID: www.researcherid.com/rid/F-2513-2010

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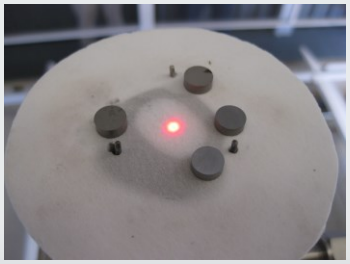

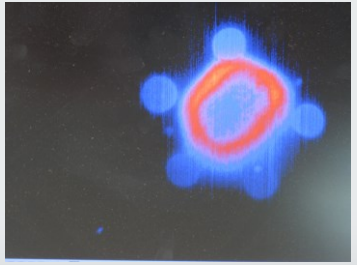

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The team of IST researchers affected to the STAGE-STE

Dr Jorge C Fernandes, Professor Auxiliar at IST, graduated in metallurgical engineering in 1986, and obtained the Ph.D. degree in materials engineering in 1994 with a thesis on characterization of fracture and fatigue performance of structural ceramics. Up to the present date, he authored/co-authored more than 60 peer reviewed articles. The main areas of activity are: processing of ceramic materials and ceramic composites, powder technology, quality control & quality management. Together with Prof L Guerra Rosa, Prof J C Fernandes has contributed to extending the horizon of materials processing with solar energy, namely in what concerns to ceramic materials processing by solar furnaces: tests using different heating and cooling cycles; comparison between solar-sintered ceramic bodies and those produced in conventional furnaces; synthesis of carbides and nitrides of d-group transition metals and kinetic aspects of reaction under the solar spectral radiation.

Dr Bin Li is currently a research scientist on computational science in the Department of Mechanical Engineering at IST. He received his Diploma (1984) and Master's (1987) in Mechanical Engineering from Northwestern Polytechnical University, China, and Ph.D. in Mechanical Engineering (1999) from the IST. He was a post-doc research fellow (2000-2001) at the Technical University of Clausthal, Germany, and a research associate (2008-2013) at ICEMS/IST, Portugal. He was an assistant professor of mechanical engineering (2002-2008) at ISEL, Instituto Politecnico de Lisboa. Bin Li conducts researches on the modelling and numerical simulation of thermal-structural interactions in solar energy systems; Thermal management of high temperature components; Residual stress analysis; Cyclic plasticity and multiaxial fatigue behaviour of metallic materials; Design sensitivity analysis and optimization, etc. He is author/co-author of 3 book chapters and over 30 peer reviewed articles.

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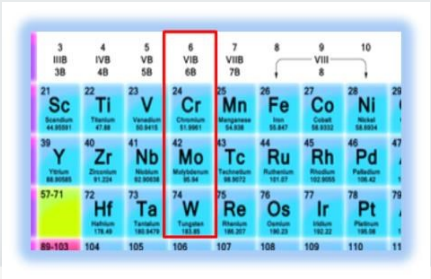

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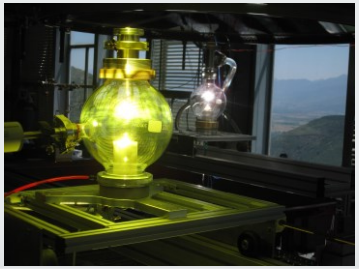
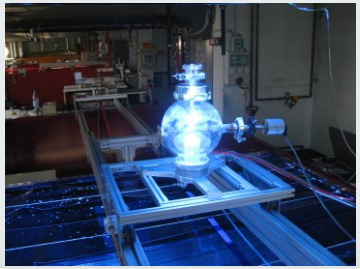
List of 5 relevant publications

- Synthesizing higher nitride of molybdenum (Mo) and iron (Fe) in ammonia (NH3) gas stream under irradiation of concentrated solar beam in a solar furnace, Materialwissenschaft und Werkstofftechnik, vol.44, no.12, pp. 959–971, 2013 (DOI: 10.1002/mawe.201300163)
- Crystal grain morphology evolution over Ti, V, Nb and Ta surface heated in N2 gas environment to 2000°C by filtered concentrated solar beam in a solar furnace at PROMES-CNRS, Materials Transactions, vol.53, no.3, pp. 537–545, 2012 (DOI: 10.2320/matertrans.M2011299)
- Temperature control of a solar furnace for material testing, International Journal of Systems Science, vol.42, no.8, pp. 1253–1264, 2011 (DOI: 10.1080/00207721.2011.588894)
- Mechanical properties of dense cordierite discs sintered by solar radiation heating, Materials Transactions, vol.50, no.9, pp. 2221-2228, 2009 (DOI: 10.2320/matertrans.MRA2008369)
- Peculiarities and improvements of PSA Solar Furnace used for synthesis of refractory carbides and carbonitrides, Proc. IHP 1st Users Workshop, held in Aguadulce (Almería, Spain), March 15th, 2001, edited by EDITORIAL CIEMAT, ISBN 84-7834-407-1 (2001) pp. 107-112.





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List of 4 relevant previous projects or activities

- Beneficiary in 2013 as “SFERA-user” of the Solar Furnace no.5 at PSA within the framework of the EU-DG RTD’s Solar Facilities for the European Research Area (SFERA) project (an activity that is regulated by a contract between the solar facility and the European Commission). The research proposal was entitled “Study on nitriding of Fe in stream of NH_3 gas and initial trials to nitride hard metal inserts using solar radiation heating” (acronym: NH3NITRIDING).
- Beneficiary in 2010 as “SFERA-user” of the PROMES-CNRS solar facilities within the framework of the EU-DG RTD’s Solar Facilities for the European Research Area (SFERA) project. The research proposal was entitled “Synthesis of carbides and carbo-nitrides under concentrated solar beam applying selected wave-length range by passing through colour filter” (acronym: SunSynt).
- Coordinator of FCT (the Portuguese national funding agency for science, research and technology) project POCTI/ESE/33804/99 “Construction of a Fresnel-Lens Solar Furnace for Synthesis and Sintering of Materials”. Starting date: November 2000. Conclusion date: April 2003. The main objective was to build a small, versatile and automated solar furnace using a Fresnel lens to concentrate the energy and a special chamber where the reactions occur.
- Project partner in INCO-COPERNICUS / THERMIE contract ICOP-DEMO-2124-1996: “High Power Density Solar Beams for Surface Modification and Synthesis of Materials for Engineering Applications” (acronym: SUNRISE). The other partners were: CENIM (Centro Nacional de Investigaciones Metalurgicas, Madrid, Spain) and Materials Science Institute of the Scientific Association "Physics-Sun" (Tashkent, Uzbekistan). Starting date: July 1997. Conclusion date: December 31, 1999.