



Symposium O : Advanced laser materials processing and control of materials properties

Scope of the Symposium

Materials processing and the control of surface properties are of utmost importance in the industrial environment. Several industries such as automotive, aerospace, oil & gas and biomedical can benefit from materials design and processing in the scope of advanced manufacturing. Among the technologies capable of processing materials, the laser-based technology rises as an advanced and promising tool due to its versatility, flexibility, and reproducibility. In addition, it is important to point out several inherent advantages such as the capability of virtually processing any type of material (metals, ceramics, semiconductors, and polymers), does not involve any physical contact with the processed material (avoiding contamination), the developed processes can be carried out at high-processing speeds and can be easily scaled-up to a production environment. Among the laser materials processing methods, one can highlight the additive manufacturing, surface treatment (texturing, cladding, surface alloying, heat treatment, shock peening, among others). As a result, these laser materials processing may increase the wear and corrosion resistance and control wettability, cellular behavior, optical and mechanical properties, giving rise to advanced materials. Study and development of industrial applications involving the use of continuous wave (CW) and pulsed lasers (short- and ultrashort pulses) for processing metallic alloys, ceramics, polymeric and composites materials fit into the present symposium.

Abstracts will be solicited in (but not limited to) the following areas

- *Laser Additive Manufacturing: reutilization of powder, topological optimization, monolithic concept and design, new metallic and ceramic powders, new ways of powder manufacturing, laser additive manufacturing for conformal cooling, heat exchangers, valves*
- *Laser surface texturing and functionalization: nano- and microtextures for controlling optical properties, the wettability of oil, water, saline solutions, and other liquids, cellular behavior, the coefficient of friction, wear and corrosion resistance*
- *Laser fabrication of nanomaterials: development and optimization of metallic, metal oxides, and polymeric nanomaterials, in particular, nanoparticles for applications in catalysis, drug delivery, antibacterial coatings, advanced liquid and dry lubricants,*
- *Laser shock peening: application of LSP in metallic alloys (steel, titanium, aluminum, among others) for improving wear and corrosion resistance and optimization of mechanical properties*
- *Other laser-based processes: laser cladding, laser surface alloying, laser heat treatment, laser micromachining, laser marking, and laser engraving*

Tentative list of invited speakers (To be confirmed)

Henrique Rodrigues Oliveira (SENAI Innovation Institute in Manufacturing Systems and Laser Processing) **Edson Costa Santos** (Carl Zeiss, Alemanha) **Liliana Canguero** (Lasea) **Luiz Guilherme de Souza Schweitzer** (Fraunhofer IPK) **Daniel Arnaldo del Cerro** (Oxford Lasers Limited) **Rui Mrio Correia da Silva Vilar** (Instituto Superior Tcnico - Universidade de Lisboa) **Rafael Botts** (Welle Laser Technology) .

Symposium Organizers

Lus Gonzaga Trabasso (SENAI Innovation Institute in Manufacturing Systems and Laser Processing) **Alexandre Cunha** (SENAI Innovation Institute in Manufacturing Systems and Laser Processing) **Paulo Wendhausen** (Federal University of Santa Catarina (UFSC)) **Milton Srgio Fernandes Lima** (Institute of Advanced Studies (IEAV)) .

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