

16<sup>th</sup> International Conference on

# Emerging Materials and Nanotechnology

March 22-23, 2018 | London, UK

## Modelling and simulation in developing advanced materials and manufacturing techniques: Semi-solid, laser processing and peening

**Sumsun Naher**

University of London, UK

There are huge current effort is on-going to optimise the process parameters for advanced materials production and manufacturing processes. This talk concentrates on the semi-solid processing of Al-SiC metal matrix composites, laser glazing, laser cladding processes and ultrasonic peening. In semi-solid main parameters investigated was viscosity, stirrer diameters, stirrer type, size, shape, velocity, distance from the bottom of the crucible to achieve homogeneous distribution of reinforcement in the matrix by using Fluent. In laser glazing heating and cooling cycle was investigated to optimise the melt pool and heat-treated zone. Laser process parameters investigated are laser power, laser irradiance, pulse repetition frequency etc. In laser cladding heating and cooling cycle together with mixture of clad materials properties were investigated to reduce residual stresses by using Ansys APLD. From conceptual, analytical and finite element models, optimized process parameters can be predicted for reduced residual stress. In ultrasonic peening process parameters were optimised to get maximum depth for compressive residual stress by using Abacus. Process parameters investigated are peening types, peening duration, distance from the peen tip etc. Simulation and modelling can play a strong role to get an in depth understanding of a new materials and manufacturing processes and also in their industrial development.

drsumsun.naher@gmail.com