

Elena Colombini

EDUCATION

- 2009 Bachelor degree summa cum laude in Design and Development of New Materials (Title of thesis: Correlation between microstructure with mechanical properties of AlSi7Mg0.3 components produced by shell molding) at University of Modena and Reggio Emilia, Department of Engineering "Enzo Ferrari".
- 2013 PhD title in High Mechanics and Automotive Design and Technology - Title of thesis: Lightweight Hybrid Structures: Nickel Aluminides and Carbon Nanotubes for High Temperature Applications " at University of Modena and Reggio Emilia, Department of Engineering "Enzo Ferrari".
- 2018 "Conseguimento Abilitazione Scientifica Nazionale per Professore di II Fascia nel settore concorsuale 09/A3"

RESEARCH and DIDACTIC ACTIVITY

She has presented her research activity in a several number of national and international congresses in the field of microwave applicator design and of microwave applications to powder metallurgy, trying to develop new processes or to enhance materials properties. During last decade he has been using commercial electromagnetic modelling software (Concerto 3.5, Comsol Multyphysics) in order to design new microwave applicators for high and low temperature heat treatments and microwave plasmas.

Her research activity is mainly focused in the metallurgy field, and in particular in the study and development of new materials and processes, preferably involving thermal applications of microwaves. Since 2016 her research was focused on High Entropy Alloys (HEAs). The microwave assisted synthetic route was broadly developed by our group to synthesize intermetallics, FGM and now high entropy alloys. Starting from literature composition several modifications have been studied (adding for example Cu, Al, Mo, Zr elements or SiC compound) and synthesized by microwave activation synthesis. The results were compared with traditional techniques (mechanical alloying, SPS, conventional furnaces).

Her scientific and technological skills are in the metallurgy field.

She spent one year at the Department Aeronautics and Astronautics (MIT) as Visiting Student. The project was sponsored by Ferrari GeS S.p.A and it grew out of a PhD project based on the study of lightweight hybrid structures for High Temperature Applications. The aim of project was the development of a new composite material combining aligned carbon nanotubes (CNTs) with carbon carbon composite (CC), with improved and tailorable properties. The synthesis of CNT on carbon-based substrate and the optimization studies of growth parameters have been developed. The obtained preliminary materials were processed into carbon-CNT matrices via infusion and pyrolysis. The results indicate that CNTs on C/C composite is a promising approach for improving the mechanical, electrical and thermal properties of structural composites.

During last five years she has been involved in LIFE+ projects: LIFE10 ENV/IT/000419 - WASTE3, involving the recycling of copper metallurgy waste using also microwave heating and for microwave applications and LIFE13 ENV/IT/000593 - Titanium life in titanium hands, regarding the recycling of Ti turnings using microwave assisted combustion synthesis (responsible of Unit).

AFFILIATION

Member of:

- Ampere (Association for Microwave Power in Europe for Research and Education) since 2016 (www.ampereeurope.org)
- Italian Metallurgical Association (AIM - Associazione Italiana di Metallurgia) since 2010 (www.metallurgia-italiana.net)