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Role of sintering method on graphene/3YTZP composites

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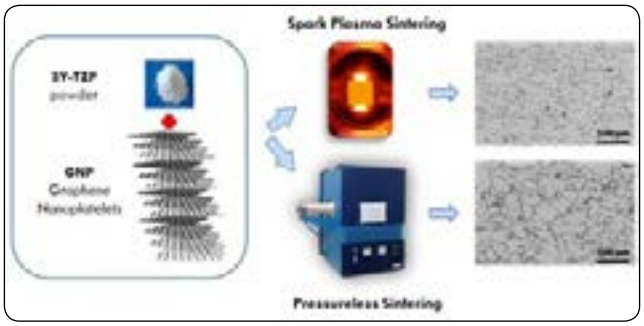
Graphene in the form of graphene nanoplatelets (GNP), graphene oxide or few layer graphene has become an ideal filler in fabrication of different polymer, metal or ceramic composites. Recently, the fabrication of ceramic matrix composites with graphene-based materials has attracted a special interest due to the potential improvement of mechanical and functional properties. Amongst ceramic matrices, 3 mol% yttria tetragonal zirconia (3YTZP) presents outstanding mechanical properties and with the addition of GNP can become electrically conductive. The properties of the materials depend not only on the composition, but also on the microstructure. In the case of ceramics, the processing method has a great importance from the point of view of the final properties. Graphene / ceramic composites are typically prepared through wet powder processing followed by a pressure assisted sintering technique, such as Spark Plasma Sintering (SPS) or Hot Pressing (HP). SPS advantages over HP include lower sintering temperatures and shorter sintering times. However, it requires expensive equipment and produces highly anisotropic materials. Conventional pressureless sintering (PLS) is a simpler and cheaper sintering method that produces composites with lower anisotropy. Therefore, the study of graphene / ceramic composites prepared by PLS compared to SPS sintered ones is very interesting. The main objective of this work is to make a direct comparison of the effects of these two sintering techniques (PLS and SPS) on the microstructural features, mechanical and electrical properties of composites of 3YTZP with different contents of GNPs.



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Biography

Cristina López Pernía is a doctoral candidate at the Department of Condensed Matter at Universidad de Sevilla. She graduated with a Bachelor of Materials Engineering from Universidad Politécnica de Madrid and holds a Master's Degree in *Advanced Materials* from Universidad Autónoma de Madrid. Currently she focuses her work on graphene-ceramic composites.

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