Production of carbon-based materials, from graphite eletrodes (waste), for applications in Mechanical Engineering

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Abstract

The study, based on a circular economy concept, aims to develop a feasible, reliable and secure method that can be carried out on an industrial scale, by transforming graphite electrodes (waste from EDM processes) into new carbon-based materials - graphite functionalized or not with oxygen, reduced, or even graphene - in order to reuse them in another form in final products.
Various exfoliation techniques were studied: electrodes friction, ball milling, cryogenic milling and detonation. The materials were characterized using different techniques, such as, Raman spectroscopy, Transmission Electron Microscopy (TEM) and Scanning Electron Microscopy (SEM).
The obtained raw materials can be used as reinforcement additives/reinforcements of polymeric materials, improving their physical and mechanical properties.

Figures

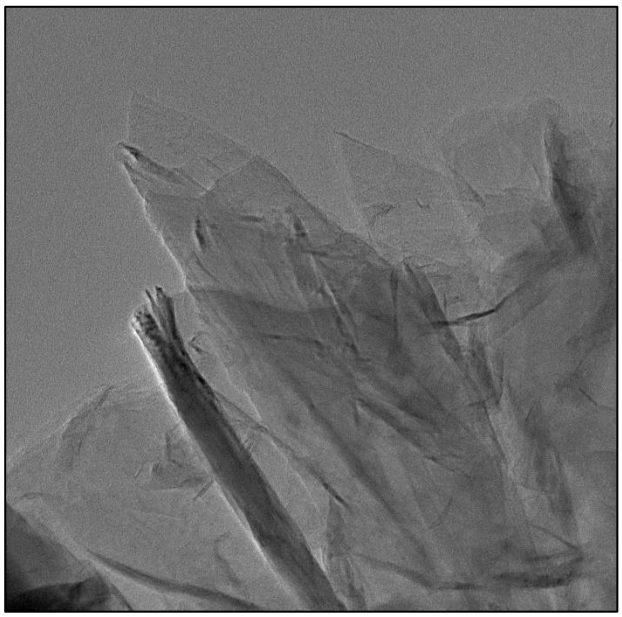

Figure 1. Multilayer graphene production using ball milling technique (TEM analysis).