Synthesis of nanometric graphene oxide and its effects when added in $MgAl_2O_4$ ceramic

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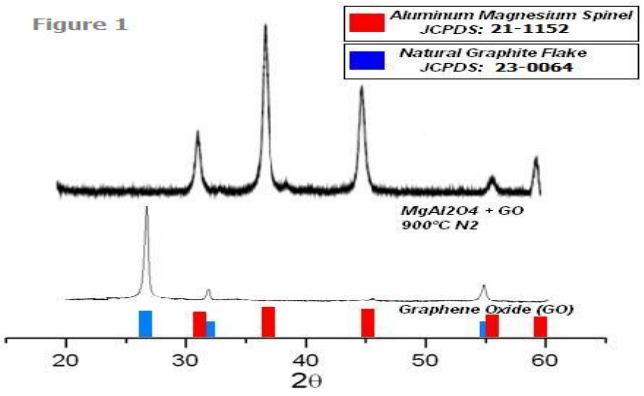
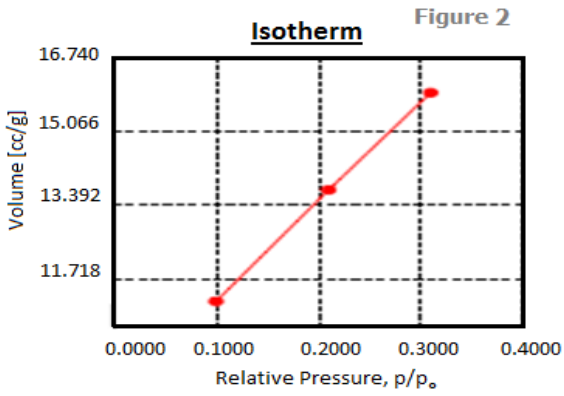
Graphene is an allotropic carbon form and consists of a single carbon layer of graphitic structure, this material has been receiving additional scientific interest because of its individual properties and the enhancement of properties it may cause in other materials already broadly used[1]. In this work, nanometric graphene oxide was synthesized through intercalated graphite as reported by Nakajima and Matsuo[2] followed by exfoliation at 1000ºC for 30 seconds generating expanded graphite which was sonicated separately in anhydrous ethanol and N,N-dimethylmethanamide solutions at a frequency of 22 kHz in a tip ultrasound (UP100H-Hielscher). This nanometric graphene oxide with and without functionalization has been added in a synthetic ceramic body of $MgAl_2O_4$, with the objective of study its microstructural changes. $MgAl_2O_4$ samples were prepared from a precursor solution of magnesium and aluminum nitrate, they were then dried for 3 hours at 100ºC and sintered at different temperatures in N_2 and static air. The nanometric graphene oxide and the resulting ceramic were characterized using X-ray diffractometry (XRD-6000, Shimadzu), scanning electron microscopy (SEM-550, Shimadzu) and nitrogen physisorption (Autosorb). The sample diffratogram (Figure 1) showed no presence of graphene in the resulting ceramic at temperatures above 900ºC without functionalization and nitrogen physisorption indicated a considerable increase of its surface area, calculated from the isotherm (Figure 2) by the B.E.T. method as 44.94 m²/g.





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