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# Graphene-containing thin films prepared by calcination of polyaniline/montmorillonite nanocomposite

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## Abstract

Polyaniline/montmorillonite nanocomposite thin films deposited on the surface of quartz glass were used for the preparation of graphene/aluminosilicate thin films by calcination at 1300 °C in argon atmosphere. Presence of graphene formed from polyaniline chains was confirmed by Raman spectroscopy. Such prepared graphene/aluminosilicate thin films exhibit very high electrical conductivity (maximum value  $\sigma = 9324 \text{ S}\cdot\text{m}^{-1}$  was reached) in comparison with uncalcined polyaniline/montmorillonite thin films having a maximum conductivity one order of magnitude lower ( $\sigma = 396 \text{ S}\cdot\text{m}^{-1}$ ). The maxima of electric current observed for the calcined thin films in current distribution maps obtained by an atomic force microscope operated in scanning spreading resistance microscopy mode are five times higher than the maxima observed for the uncalcined thin film. Current distribution maps also show the key role of montmorillonite particles in the formation of graphene.

**Keywords:** Graphene; Polyaniline; Montmorillonite; Thin Film; Conductivity; Calcination

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