

ALUMINUM-GRAPHENE COMPOSITE MATERIALS WITH THE UNIQUE PHYSICO-CHEMICAL AND MECHANICAL PROPERTIES

Yolshina L.A., Muradymov R.V.

*Institute of High-Temperature Electrochemistry UB RAS,
620990, Ekaterinburg, Akademicheskaya str. 20,
e-mail: yolshina@ihte.uran.ru*

A new method of creating composite metal materials based on aluminum, containing carbon in the form of graphene sheets uniformly distributed in an aluminum matrix, without the formation of aluminum carbide in a halide melt at temperatures of 973-1073 K, is developed. Graphene synthesis is a one-step process that occurs directly in a molten aluminum matrix without the need for a separate stage of synthesis and isolation of carbon nanomaterials, which reduces the complexity of obtaining aluminum composites with a high carbon content. Aluminum-graphene metal composites obtained by this method are distinguished by a uniform distribution of graphene flakes of 100 nm to 100 μm in size over the metal, which leads to a high homogeneity of the properties of the composites.

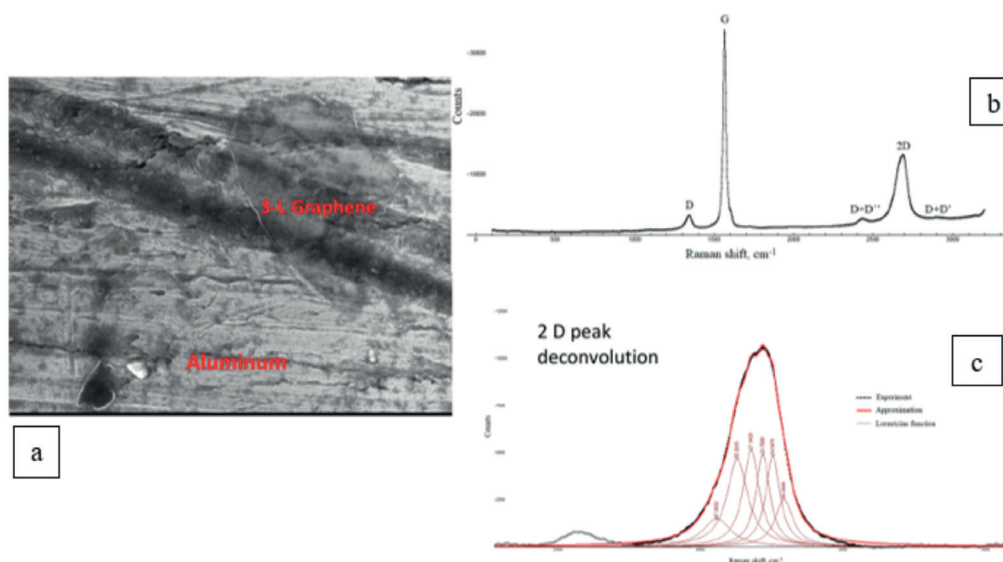


Figure 1. SEM-image of cross-section of (a) aluminum-graphene composite material, (b) Raman spectrum of graphene inclusion in aluminum matrix and (c) deconvolution of 2D peak.