***A Novel Method of the Synthesis of Aluminium-Graphene Metallic Composite***

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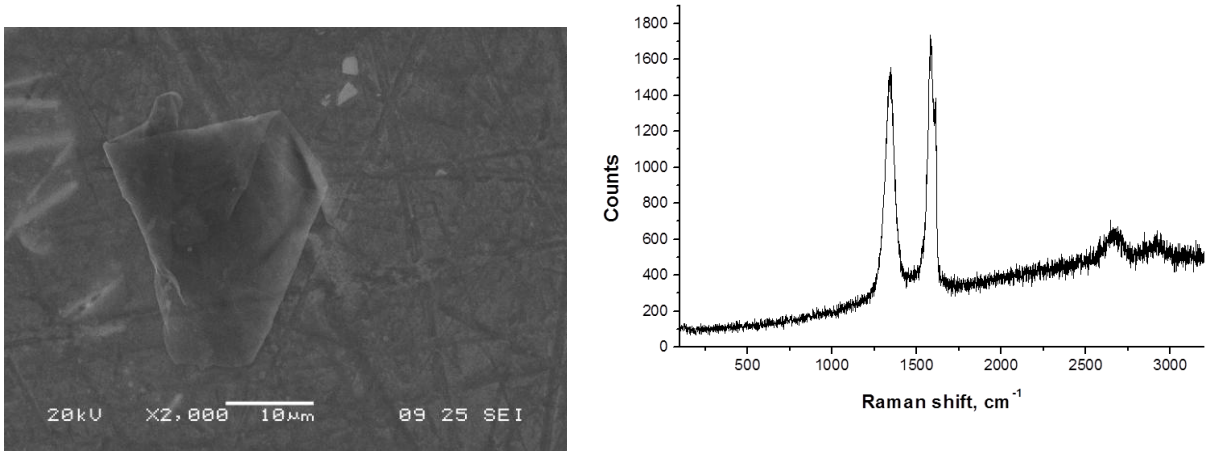
The creation of graphene-containing metallic composites is one of the most advanced and remarkable problems of scientific investigations in nano-scale technology nowadays. The biggest advantage of application of such metal-graphene composites is the possibility of improvement of electrical and thermal conductivity of metals because of graphene ones. The biggest problem in practical realization of this idea is the lack of industrial methods of large scale graphene production, its high cost and difficulties of graphene mixing with metals. The main secularity of proposed method is graphene layers form directly in the bulk of metal, e.g. aluminium, during one step interaction of molten aluminium with the carbon containing solid inorganic or organic precursor in molten salts media.

Presented new method allows creating either graphene film layers or graphite crystals in aluminium at ambient pressure and relatively low temperature gape. The formation of different carbon allotrope modifications correlates perfect with the experiment conditions such as temperature, type and concentration of carbon containing addition in halide fusion, also as consequence sample temperature treating.

Thus obtained aluminium-graphene metallic composites has micro hardness and elastic modulus at least two times higher that aluminium ones. Prolonged corrosion tests and electrochemical tests show that aluminium-graphene composites are more electrochemically active as to pristine aluminium.




SEM-image of aluminium cross section and Raman spectrum of graphene inclusion in it.