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## **Triple graphite cointercalation compounds – promising source of carbon nanomaterials**

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Obtaining of nanoscrolls and few-layer graphenes by sonication of triple graphite nitrate cointercalation compounds (GNCC) in liquid media was investigated. Graphite nitrates sequentially cointercalated with ethyl formate and acetic acid as well as ethyl formate and ethyl acetate were used as source of carbon nanoparticles. Spontaneous bloating of particles for these compounds has been observed in their drying process at 20 °C. The microstructure of obtained carbon nanoparticles was investigated by transmission electron microscopy. GNCC sonication in liquid media does not lead to complete exfoliation of graphite matrix. In addition to planes with a thickness of several atomic layers with scrolled edges there were particles with bloated carbon layers. It was due to evaporation of the intercalant between adjacent carbon planes under vacuum and electron beam conditions. Defects formation on the surface of such particles was observed. Further particles destruction and growing of defects goes in drying process at room temperature. As a result nanoscrolls were formed. Large graphene-like particles without visible signs of surface defects can be produced by the method as well.

The presented results revealed graphite nitrate cointercalation compounds to be a promising source of carbon nanomaterials.

### **Summary**

It has been shown that sonication of new triple graphite cointercalation compounds in ethyl alcohol gives carbon nanoparticles. Samples of graphite nitrate sequentially cointercalated with ethyl formate and acetic acid as well as ethyl formate and ethyl acetate were selected as precursors of carbon nanoparticles. The microstructure of the obtained carbon nanoparticles was investigated by the transmission electron microscopy method.

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