

POLYHEDRAL GRAPHITE PARTICLES AMBIENT AIR DIRECT CURRENT ARC PLASMA SYNTHESIS*

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The arc plasma method is useful to produce carbon nanoparticles for many years [1]. Many papers have discussed the possibility of the carbon nanotubes synthesis by the direct current arcing procedure [2]. Carbon nanotubes, graphene based materials are very popular and have been studied in details, however there are many other morphological types of carbon nanoparticles, for example polyhedral graphite nanoparticles (PGPs). PGPs have the potential for application as an electron field emitter and as a material for electrical energy supercapacitors because of their unique morphology [3]. These particles can be obtained by the direct current arc plasma technique under protective gas medium (helium, hydrogen and helium mixture of hydrogen) [3-4]. In this paper, we present results of the experimental research to discuss the possibility of PDPs synthesis using self-shielding ambient air direct current arc plasma [5] and molybdenum catalyst. This vacuumless method is possible because of the carbon monoxide and carbon dioxide emission during the arcing [5-6]. This approach is very promising due to the potential energy and cost efficiency and simplicity [7]. The PGPs ambient air direct current arc plasma synthesis has never been discussed before.

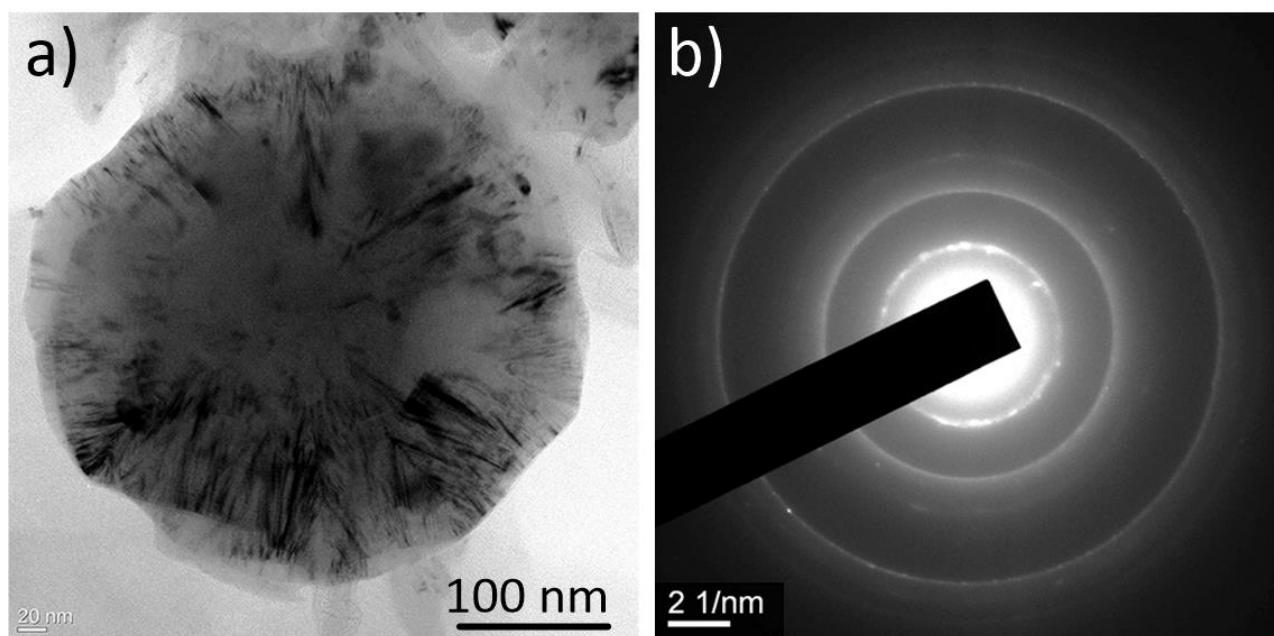


Fig.1. Transmission electron microscopy of the obtained powder product: a) HRTEM image of the PGP; b) selected area electron diffraction pattern.

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