

MOLYBDENUM CARBIDE EMBEDDED INTO CARBON MATRIX SYNTHESIZED BY DC ARC PLASMA *

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Molybdenum carbide is one of the most important material among metal carbides because of its unique physical and chemical properties such as good resistance to corrosion and oxidation, high abrasion resistance, relatively high electrical conductivity, high melting point, high hardness [1]. Molybdenum carbide due to its catalytic activity can be used for non-platinum electrocatalyst in order to develop cost-effective hydrogen-evolutions technologies [2]. Traditionally molybdenum carbide is synthesized by carbon and molybdenum (or molybdenum oxide) powder mix annealing at ~1400 °C - 1500 °C. Also molybdenum carbide crystalline phases can be obtained by DC arc plasma generation [3-4]. One of the useful material for catalysis is considered a composite based on molybdenum carbide nanoparticles embedded in to carbon matrix [5] because of possible particles surface oxidation exposed by air and aggregation of pure molybdenum carbide materials.

In this paper the material based on molybdenum carbide Mo₂C nanoparticles embedded into carbon matrix is presented. This material has been prepared by the DC arc discharge procedure. The typical high resolution TEM-image and selected area electron diffraction pattern are presented in the Fig. 1. The particle averaged size is about ~3-5 nm; according to the selected area electron diffraction data these particles are characterized by the structure close to the Mo₂C.

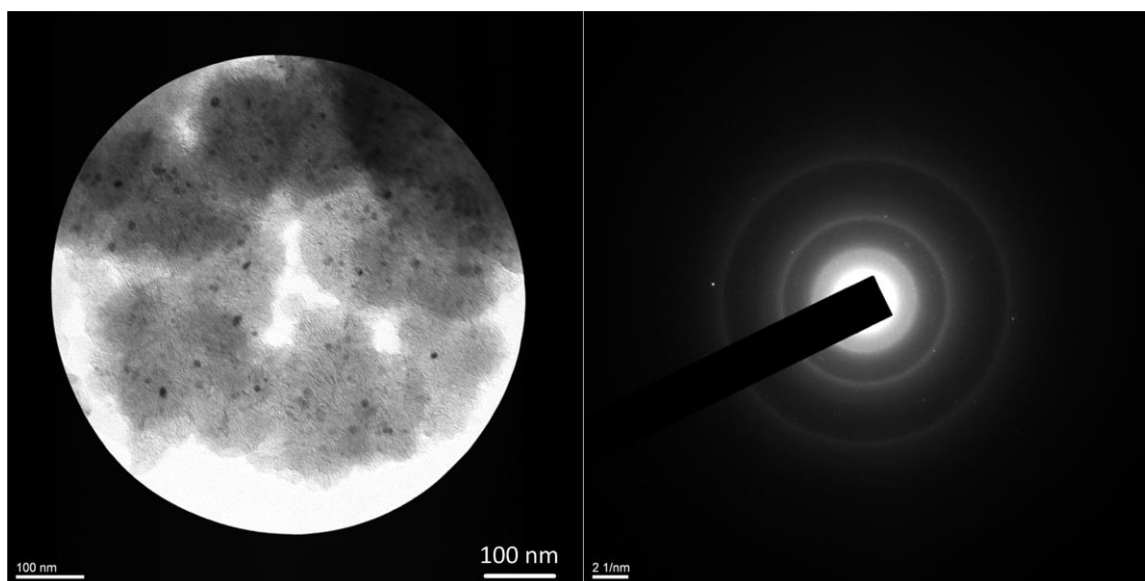


Fig. 1. Typical HRTEM-image and SAED

The arc discharge method is possible to use for molybdenum carbide embedded into the carbon matrix material synthesis. Such material according to the literature data can be useful as a catalyst for the hydrogen evaluation processes.

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