THE INFLUENCE OF THE CENTRAL ELECTRODE MATERIAL ON THE SYNTHESIS PRODUCT IN W-C SYSTEM[1]

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At present platinum-based catalysts is widely used in fuel cells. However, these catalysts have some disadvantages such as high cost and limited long-term stability. Therefore less expensive alternatives are being searched for, substituting for platinum and not influencing catalytic activity adversely. Nanosized tungsten carbide is recognized as promising alternative [1-3].

One of the possible synthesis method of tungsten carbide nanoparticles is plasma dynamic synthesis in an electrodischarge plasma jet generated by a high-current coaxial magnetoplasma accelerator (CMPA) [4]. The device is experimental and needs further investigation. This paper introduces synthesis product depending on the central electrode material: tungsten and graphite. The X-ray diffraction (XRD) determination shows that the synthesized product is composed of WC1-x, g-C, WC, W2C and pure W in both experiments. In both cases, range of particle distribution size is from 10 nm to 200 nm, determined by transmission electron microscopy. The investigations indicated that application of graphite central electrode of CMPA provides with growth of the WC1-x concentration due to increasing of discharge power and plasma temperature as compared with tungsten electrode.

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