Synthesis of Mesoporous Tungsten Carbide via Nano-replication Method for Direct Methanol Fuel Cell

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Tungten carbides have been widely studied due to their excellent catalytic properties in hydrocarbon reforming, isomerization, and so on. According to the properties, they were expected to substitute expensive Pt catalyst. And thungsten carbides have a unique property to resist catalytic poisoning with carbon monoxide and hydrocarbons. In this regards, there have been various synthetic methodes such as direct carbonization, pyrolysis of metal complex, plasma-enhanced CVD, and sonochemical synthesis for the preparation of nanostructured thungsten carbide materials. However, the synthesis processes need harsh condition, for example, very high temperatures, several steps, and specials equipments, and resulted in the formation of large crystalline materials with low surface area, which can be a cruicial drawback for their catalytic application. Here, we report a novel route for the fabrication of mesoporous carbon-thungsten carbide nanocomposite via nano-replication. The mesoporous W_2C-carbon nanocomposites, which have well developed mesopore and high surface area, is expected to be useful for catalyst support and electrode for direct methanol fuel cell.