Tungsten carbide powders were synthesized as a potential electrocatalyst for the hydrogen evolution reaction in phosphoric acid at elevated temperatures. With ammonium metatungstate as the precursor, two synthetic routes with and without carbon templates were investigated. Through the intermediate nitride route and with carbon black as template, the obtained tungsten carbide samples had higher BET area. In 100% H3PO4 at temperatures up to 185°C, the carbide powders showed superior activity towards the hydrogen evolution reaction. A deviation was found in the correlation between the BET area and catalytic activity; this was attributed to the presence of excess amorphous carbon in the carbide powder. TEM imaging and TGA-DTA results revealed a better correlation of the activity with the carbide particle size.
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