Technology Offer

Process for producing a mesoporous carbide

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Mesoporous materials present a large surface-to-volume ratio providing sites for catalysis, molecular separation, adsorption or chemical sensing. Some of the classical mesoporous materials employed include silica, alumina, zirconia, zeolites, and other diverse oxides such Ti or Co, and they are synthetized by routes as self-assembly, sol-gel, spray drying and some variations of these methods known in the state of the art. Additionally, some elements of the platinum group such as Pd, Ru, and their alloys are broadly used and investigated, also as thin films on mesoporous supports to achieve lower costs or superior stability. Transition metals such Fe represent a cheaper option with high catalytic properties. One of the reasons that iron or its alloys are not considered for this purpose is its low environmental and thermal stability.

The present invention provides a process for the preparation of a nanocrystalline alloy which further forms microstructure of mesopores. It is another object of present invention to provide an alloy which shows a fine mesoporous structure with improved stability against corrosion and at high temperatures.

Technology

The patented technology is a method for producing a mesoporous carbide is claimed wherein an amorphous alloy comprising in atomic percent $Fe_aCr_bMo_cC_dB_e$ wherein a = 35…65, b = 10…20, c = 10…20, d = 12…20, e = 0…10, and unavoidable impurities is subjected to a heat treatment in order to obtain a crystalline fraction above 50 % of the alloy, and the product from the heat treatment is subjected to a chemical and/or electrochemical treatment. The obtained mesoporous carbide has a fine mesoporous structure with improved stability against corrosion and at high temperatures.

Patent Information

Granted EP patent EP2664683 (A1).

Literature

Element-Resolved Corrosion Analysis of Stainless-Type Glass-Forming Steels
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