Study of nano-crystalline metals prepared by selective chemical leaching

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Nano-crystalline metals with structural constituents smaller than 100 nm are prospective materials due to very high hardness and strength, high specific surface, chemical catalytic activity, high gas absorption capability and other characteristics. They can be produced by various methods like precipitation from liquids, vapor deposition techniques, intensive plastic deformation, rapid solidification etc. These methods enable obtaining materials of a wide range of crystallite size. The selective leaching of appropriate alloys is another method to prepare nano-crystalline metallic powders (Fe, Co, Cu, Ni etc.) with high specific surfaces. So far, these powders have been studied mainly for catalytic or magnetic purposes. But we illustrate in the present study that these powders can be successfully applied also in the development of bulk materials with a high hardness and strength (Cu) and of media with excellent hydrogen storage capacity (Ni).

Key words: nano-crystalline metal, nickel, copper, hardness, structure

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