Mg based hydrogen storage nano composites synthesized through arc plasma method and post treatments

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Mg based materials are widely regarded as promising hydrogen storage candidates due to their high storage capacity up to 7.6wt%, environmental friendlessness and low cost. However, the high hydrogen sorption temperature and sluggish kinetics have greatly limited the potential applications of Mg based hydrogen storage materials. In the present work, core-shell structured Mg based hydrogen storage materials were prepared through approaches involving arc plasma method followed by different post-treatments. Pure Mg, Mg-Rare earth (RE) and Mg-Transition metal (TM) ultrafine powders were firstly obtained by arc plasma evaporation and condensation. These powders were then post treated by in-situ oxidation or electroless plating in solutions to create nanostructured shells on Mg based ultrafine particles, leading to the formation of core shell structured Mg based nano composite materials. These core-shell structured binary or ternary Mg based composite materials show superior hydrogen storage properties. Other Mg based hydrogen storage nano materials, such as Mg_2FeH_6, can be also prepared through the arc plasma evaporated Mg and transition metal/alloys. The results show that arc plasma method combining post treatments are efficient approaches for producing advanced Mg based hydrogen storage materials.