

Skeletal Ni catalyst prepared under low temperature and its methane steam reforming for hydrogen production application

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The new preparation method has been introduced to synthesis Ni-Al alloy powder using $AlCl_3$ as an activator at relatively low $500\sim 600^\circ C$ and vacuum condition. The used $AlCl_3$ served as the catalyst, promoting the reaction between Ni and Al powder to lower down the fabrication temperature by $900\sim 1000^\circ C$ compared with that of the conventional process. Ni-Al alloy properties prepared by varying parameters were investigated and the as prepared Ni-Al alloys were alkali leached by NaOH solution for surface modification to prepare the novel skeletal Ni catalyst.

Also, the methane steam reforming activity tests were performed at temperature range of $600\sim 850^\circ C$ to investigate the possibility as a catalyst. As results, it was confirmed that the leached Ni₅₀Al alloy shows as good methane conversion and long term stability as that of commercial catalyst and superior H₂ yield at low temperature of $600\sim 750^\circ C$.