

## One-pot Synthesis of Ni/Al<sub>2</sub>O<sub>3</sub> Particles via Aerosol-assisted EISA Method

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In methane reforming reaction, Ni/Al<sub>2</sub>O<sub>3</sub> catalysts have a cost advantage over noble metal catalyst while have relatively low reactivity and coking problem. In the view point of cost, conventional catalyst preparation methods, such as precipitation, impregnation, etc. consist of serial time consuming steps which inevitably increase the cost. Typical steps are support synthesis, calcination, metal precursor introduction, calcination, and finally reduction. Integrated process of support synthesis and active site deposition process was developed to reduce the steps of catalyst preparation process and induce the strong metal support interaction which suppresses the coke formation.

The Ni/Al<sub>2</sub>O<sub>3</sub> particles were obtained via spray pyrolysis technic in which a stream of aerosol of precursor solution is generated and pyrolyzed in fast and continuous manner. The precursor solution was composed of nickel precursor, aluminum precursor and structure directing agent to integrate the support structuring and active site deposition. The structure of support was formed via evaporation induced self-assembly (EISA) within a few seconds of pyrolysis process.