

# Characterization & Reactivity of Pd catalysts Supported on Spinel $MgAl_2O_4$ for Coupling of Ethylbenzene Dehydrogenation with Nitrobenzene hydrogenation

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## Abstract

Styrene is an important bulk monomer in polymer industry for manufacturing thermoplastics and synthetic rubber. It is produced industrially by dehydrogenation of ethylbenzene (DHEB) along with hydrogen as a co-product over K doped iron catalyst. The yield of styrene cannot be significantly enhanced in commercial process due to thermodynamic limitations. The continuous removal of hydrogen in DHEB improves the performance of the process. Coupling of this reaction with hydrogenation of nitrobenzene over a single dual functional catalysts attracts industrial as well as academic researchers. Moreover it is more energy saving process. Thus, a series of Pd (0.5-4 wt %) catalysts supported on  $MgAl_2O_4$  were prepared. The catalyst samples were characterized by X-ray diffraction (XRD),  $H_2$ -Temperature programmed reduction (TPR), CO chemisorption and BET surface area. The metallic desorption and particle size was obtained by CO chemisorption. The catalytic activities were evaluated for the above coupling reaction and discussed in terms of their characterization results.