

## Accepted Manuscript

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PII: S0169-4332(15)01256-8  
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2015.05.128>  
Reference: APSUSC 30454

To appear in: *APSUSC*

Received date: 11-3-2015  
Revised date: 18-5-2015  
Accepted date: 21-5-2015

Please cite this article as: D. Liu, P. Bai, P. Wu, D. Han, Y. Chai, Z. Yan, Surface chemistry and catalytic performance of chromia/alumina catalysts derived from different potassium impregnation sequences, *Applied Surface Science* (2015), <http://dx.doi.org/10.1016/j.apsusc.2015.05.128>

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# Surface chemistry and catalytic performance of chromia/alumina catalysts derived from different potassium impregnation sequences

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## Highlights

- Impregnation sequence influenced the surface acidity and Cr species distribution.
- Cr/K/Al<sub>2</sub>O<sub>3</sub> with K doped prior to Cr exhibited better catalytic performance.
- Catalyst Cr/K/Al<sub>2</sub>O<sub>3</sub> possesses mainly polymeric chromium species.
- Catalyst K/Cr/Al<sub>2</sub>O<sub>3</sub> possesses mainly oligomeric and isolated chromium species.
- Oligomeric and isolated chromium species were more inclined to form coke deposits.

## Abstract

Chromia/alumina catalysts prepared with different K impregnation sequences were compared in the dehydrogenation of propane. The materials were characterized by a variety of techniques. The catalyst with K impregnated prior to Cr loading (sample Cr/K/Al<sub>2</sub>O<sub>3</sub>) exhibited higher propene selectivity than that prepared with the reverse impregnation sequence (sample K/Cr/Al<sub>2</sub>O<sub>3</sub>). Catalyst Cr/K/Al<sub>2</sub>O<sub>3</sub> possesses a higher

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