

## Accepted Manuscript

Title: Nanoflake-assembled Al<sub>2</sub>O<sub>3</sub>-supported CeO<sub>2</sub>-ZrO<sub>2</sub> as an efficient catalyst for oxidative dehydrogenation of ethylbenzene with CO<sub>2</sub>

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PII: S0169-4332(16)32623-X  
DOI: <http://dx.doi.org/doi:10.1016/j.apsusc.2016.11.180>  
Reference: APSUSC 34485

To appear in: *APSUSC*

Received date: 11-10-2016  
Revised date: 21-11-2016  
Accepted date: 23-11-2016

Please cite this article as: Tehua Wang, Xiaolin Guan, Huiyi Lu, Zhongwen Liu, Min Ji, Nanoflake-assembled Al<sub>2</sub>O<sub>3</sub>-supported CeO<sub>2</sub>-ZrO<sub>2</sub> as an efficient catalyst for oxidative dehydrogenation of ethylbenzene with CO<sub>2</sub>, Applied Surface Science <http://dx.doi.org/10.1016/j.apsusc.2016.11.180>

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**Nanoflake-assembled Al<sub>2</sub>O<sub>3</sub>-supported CeO<sub>2</sub>-ZrO<sub>2</sub> as an efficient catalyst for oxidative dehydrogenation of ethylbenzene with CO<sub>2</sub>**

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### Highlights

- The slit-shape pores of nanoflake-assembled Al<sub>2</sub>O<sub>3</sub> favored the dispersion of Ce<sub>x</sub>Zr<sub>1-x</sub>(OH)<sub>4</sub>.
- The dispersion and Ce/Zr surface ratio of CeO<sub>2</sub>-ZrO<sub>2</sub> species were improved.
- The catalytic efficiency of CeO<sub>2</sub>-ZrO<sub>2</sub> species was significantly enhanced.

### Abstract

An Al<sub>2</sub>O<sub>3</sub> material assembled by nanoflakes was used to prepare supported CeO<sub>2</sub>-ZrO<sub>2</sub> catalyst via a deposition-precipitation method for oxidative dehydrogenation of ethylbenzene with CO<sub>2</sub>. Both unsupported and commercial Al<sub>2</sub>O<sub>3</sub>-supported CeO<sub>2</sub>-ZrO<sub>2</sub> were prepared for comparison. It was

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