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PII: S0169-4332(18)32369-9
 DOI: <https://doi.org/10.1016/j.apsusc.2018.08.226>
 Reference: APSUSC 40263

Received Date: 17 May 2018
Revised Date: 3 August 2018
Accepted Date: 26 August 2018

Please cite this article as: Y. Liu, P. Zhang, J. Zhan, L. Liu, Heat Treatment of MnCO_3 : An Easy Way to Obtain Efficient and Stable MnO_2 for Humid O_3 Decomposition, *Applied Surface Science* (2018), doi: <https://doi.org/10.1016/j.apsusc.2018.08.226>

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Heat Treatment of MnCO_3 : An Easy Way to Obtain Efficient and Stable MnO_2 for Humid O_3 Decomposition

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Abstract

The competitive water adsorption in the practical environment usually causes severe deactivation of the O_3 decomposition catalysts. In this study, MnCO_3 was used as precursor to prepare efficient and stable MnO_2 catalyst for gaseous O_3 decomposition in humid stream. The sample S-300, prepared by calcining MnCO_3 at 300 °C for 6 h, exhibited 63% (80%) of removal efficiency for 120 (43) ppm of O_3 under a high space velocity of 600 $\text{L} \cdot \text{g}^{-1} \cdot \text{h}^{-1}$ and 50% (40%) of relative humidity at 25 °C, which is superior to the commercial O_3 scrubber (oxide compound of Cu and Mn) and $\alpha\text{-MnO}_2$. However, even lower or higher treatment temperature did not further promote humid O_3 decomposition. Thorough characterizations, especially by the temperature programmed and *in situ* DRIFTS experiments, demonstrate that the large

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