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***In situ* pyrolysis of Ce-MOF to prepare CeO₂ catalyst with obviously improved catalytic performance for toluene combustion**

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ABSTRACT

Mesoporous CeO₂ catalysts (CeO₂-MOF) were synthesized by pyrolysis of Ce-MOF precursor (Ce-(1,3,5-benzenetricarboxylic acid) (H₂O)₆). Physicochemical properties of the samples were investigated by means of various techniques including XRD, SEM, TEM, BET, Raman, XPS, H₂-TPR, O₂-TPD and NH₃-TPD, and their catalytic performance were evaluated by toluene combustion compared with commercial CeO₂ (CeO₂-C) and CeO₂ prepared by precipitation method (CeO₂-P). The results show that CeO₂-MOF/350 catalyst (pyrolyzed at 350 °C) presents enhanced catalytic activity for toluene oxidation with the conversion of $T_{10\%}$, $T_{50\%}$ and $T_{90\%}$ at 180, 211, and 223 °C, respectively (SV = 20000 mL/(g h), toluene concentration = 1000 ppm). Especially for high-temperature region, CeO₂-MOF/350 catalyst displays much superior ability to

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