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## Formation of CeO<sub>2</sub> in CeTiO<sub>2</sub> catalyst studied by the in situ XANES

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Cerium-doped titanium dioxide was prepared by a sol-gel method using Titanium(IV)-isopropoxide and Ce(NO<sub>3</sub>)<sub>3</sub>•6H<sub>2</sub>O as the Ti and Ce precursors. X-ray absorption near edge structure (XANES) measurement was performed on the time-resolved XAS (Bonn-SUT-SLRI) beamline at Synchrotron Light Research Institute, Thailand. The beamline employs an energy dispersive monochromator and the position sensitive detector to record an XANES spectrum. For as prepared Ce/TiO<sub>2</sub>, XANES spectra show mainly the characteristic peaks due to the Ce<sup>3+</sup>. To monitor transition mechanism between Ce<sup>3+</sup> and Ce<sup>4+</sup> in Ce/TiO<sub>2</sub>, the in situ XANES measurements were performed. Ce L<sub>3</sub>-edge XANES spectra were recorded in 5 K intervals from 573 K to 823 K. Each spectrum was recorded at 250 ms with the averaging of 10 scans. At temperature lower than 763, there was no significant changes of whiteline peak. Two peaks corresponding to the CeO<sub>2</sub> were clearly observed at 808 K. Although the calcinations temperature was increased to 823 K, there was no significant change in Ce L<sub>3</sub>-edge XANES spectra. This result indicated the sufficient temperature for CeO<sub>2</sub> formation.

### Keywords

Ce/TiO<sub>2</sub>, in situ XANES

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