

**Heterogeneity of Deposited Phases in Supported Transition Metal  
Oxide Catalysts: Reversible Temperature-Dependent Evolution of  
Molecular Structures and Configurations**

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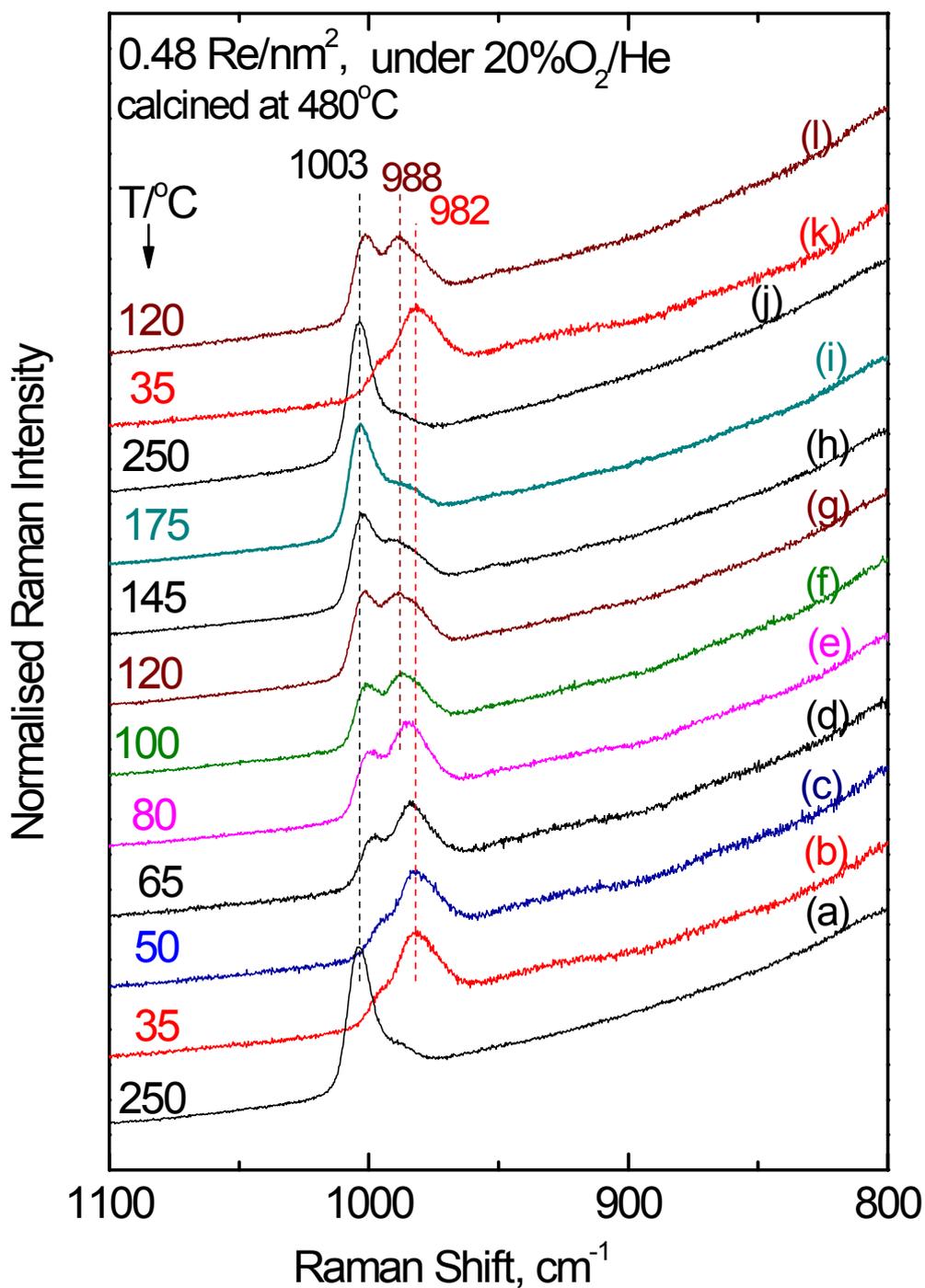
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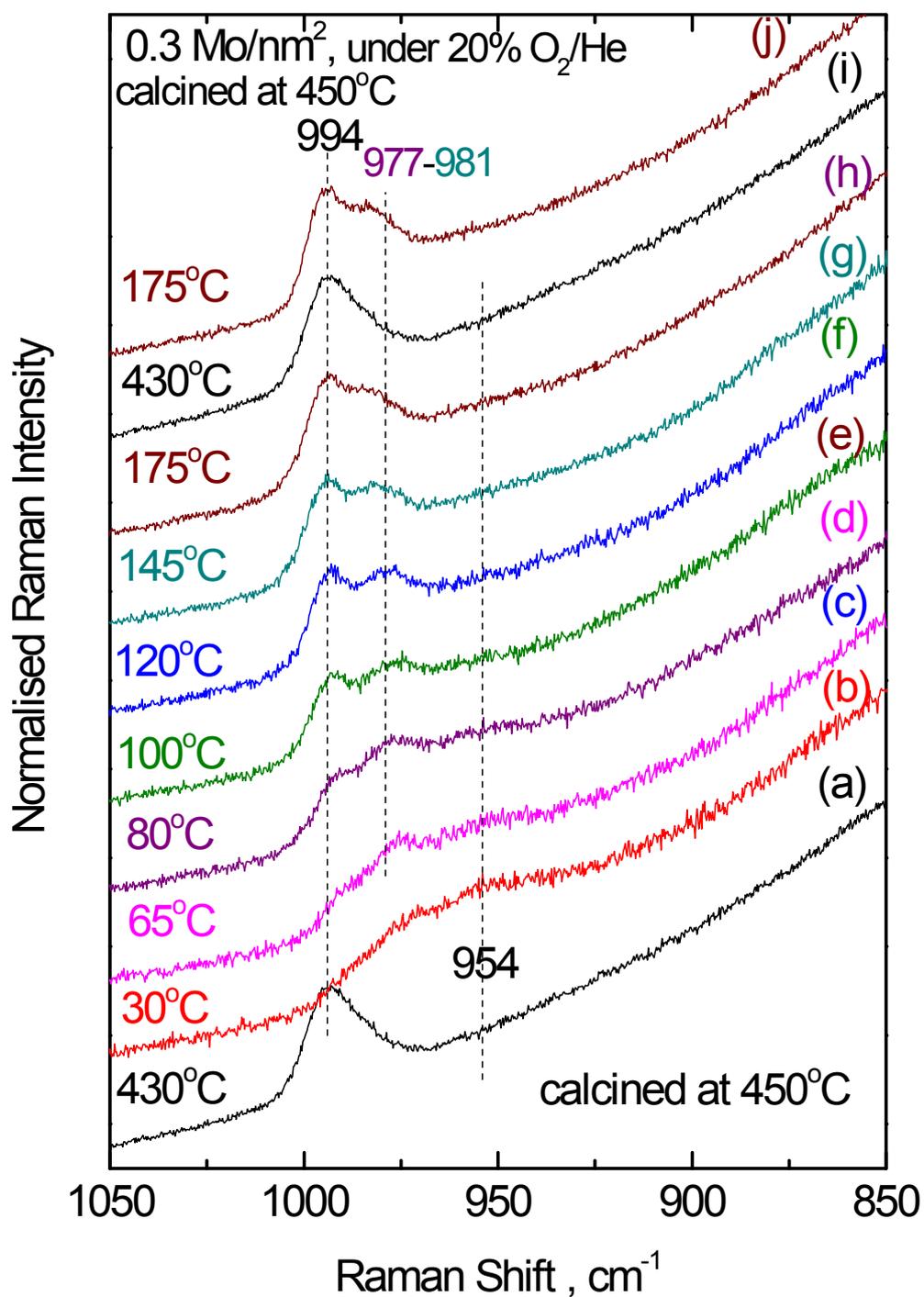
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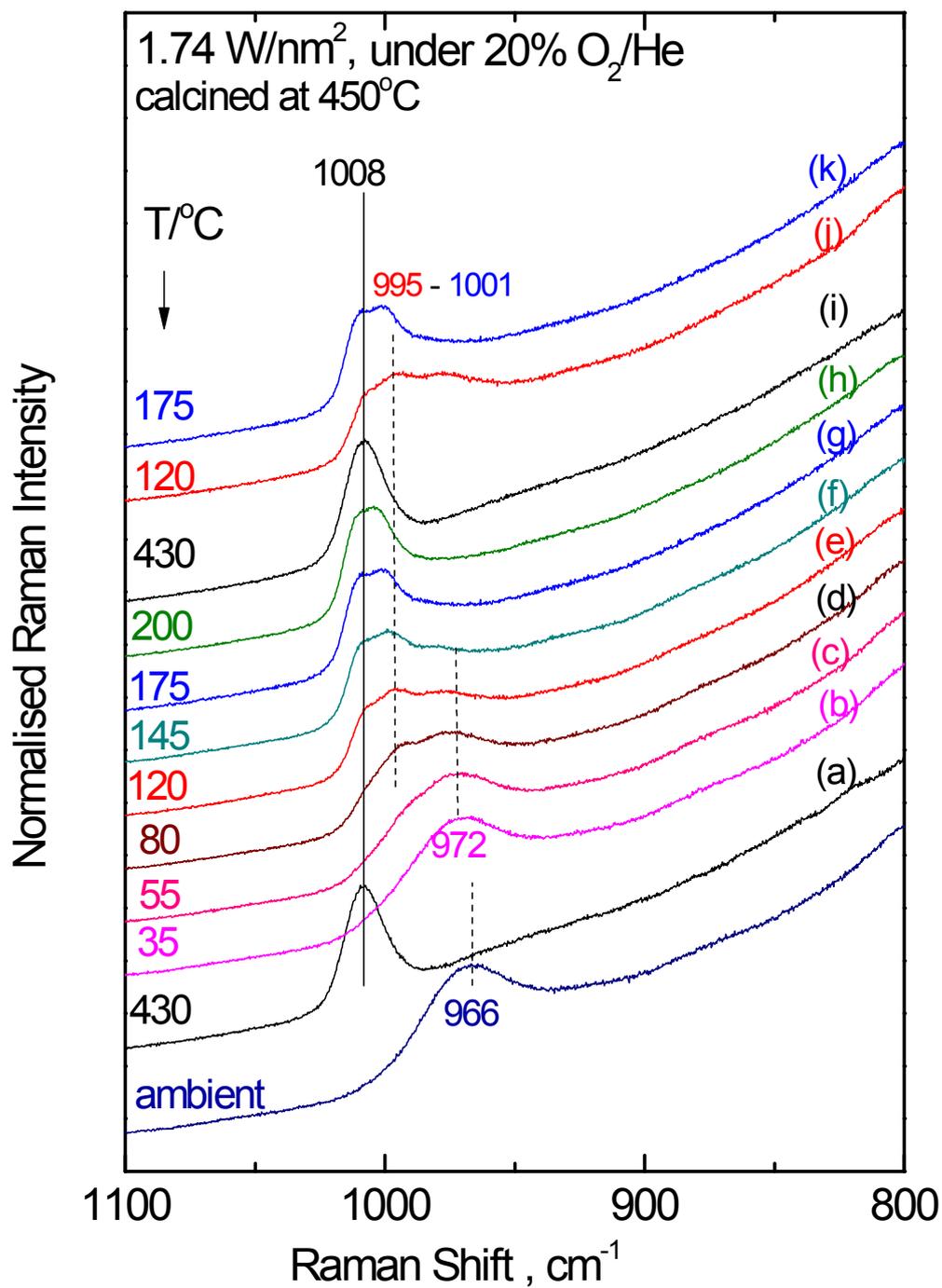
**SUPPORTING INFORMATION**



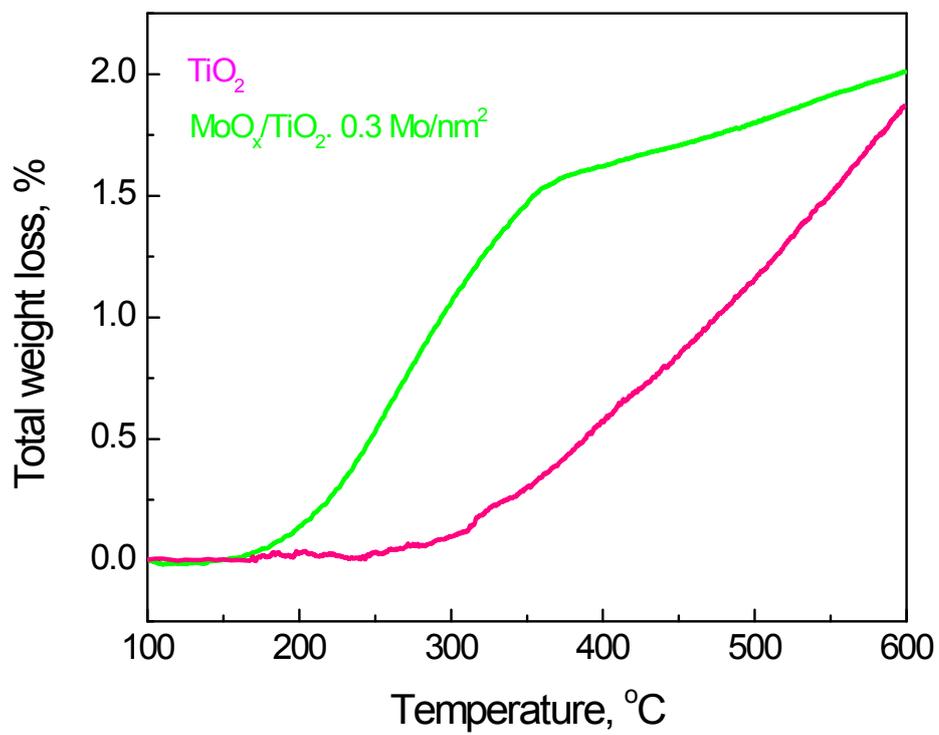
**Figure S1.** Temperature dependence of *in situ* Raman spectra obtained for the ReO<sub>x</sub>/TiO<sub>2</sub>(P25) catalyst (0.48 Re/nm<sup>2</sup>) under flowing 20%O<sub>2</sub>/He at temperatures as indicated by each spectrum. Recording parameters: see Figure caption 1.



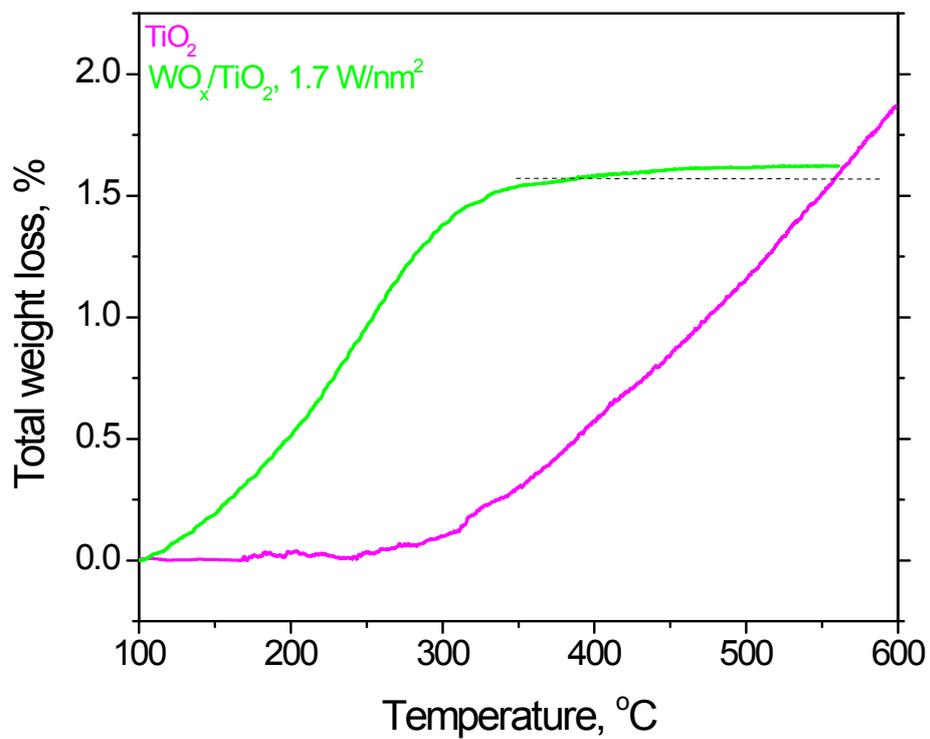
**Figure S2.** Temperature dependence of *in situ* Raman spectra obtained for the MoO<sub>x</sub>/TiO<sub>2</sub>(P25) catalyst (0.30 Mo/nm<sup>2</sup>) under flowing 20%O<sub>2</sub>/He at temperatures as indicated by each spectrum. Recording parameters: see Figure caption 1.



**Figure S3.** Temperature dependence of *in situ* Raman spectra obtained for the MoO<sub>x</sub>/TiO<sub>2</sub>(P25) catalyst (0.30 Mo/nm<sup>2</sup>) under flowing 20%O<sub>2</sub>/He at temperatures as indicated by each spectrum. Recording parameters: see Figure caption 1.



**Figure S4.** TGA curves for the TiO<sub>2</sub>(P25) support and MoO<sub>x</sub>/TiO<sub>2</sub>(P25) sample.



**Figure S5.** TGA curves for the  $\text{TiO}_2(\text{P25})$  support and  $\text{WO}_x/\text{TiO}_2(\text{P25})$  sample.