



Title	Bimodal cesium hydrogen salts of 12-tungstosilicic acid, $CsxH4-xSiW12O40$ , as highly active solid acid catalysts for transesterification of glycerol tributyrates with methanol
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## Supplemental Information

### **Bimodal Cesium Hydrogen Salts of 12-Tungstosilicic Acid, $\text{Cs}_x\text{H}_{4-x}\text{SiW}_{12}\text{O}_{40}$ , as Highly Active Solid Acid Catalysts for Transesterification of Glycerol Tributyrates with Methanol**

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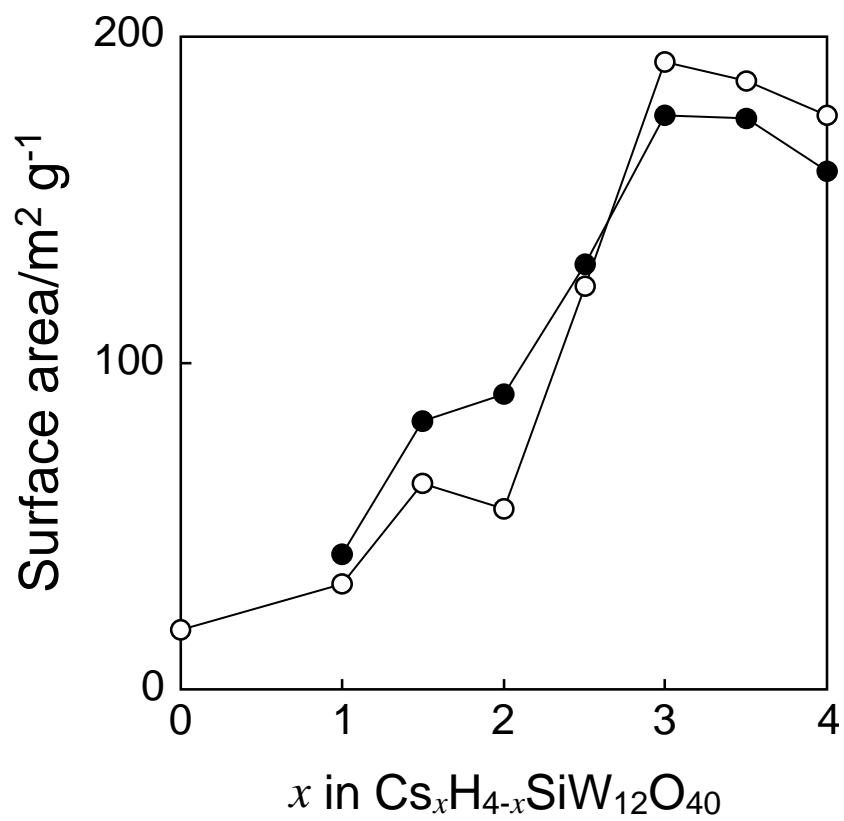
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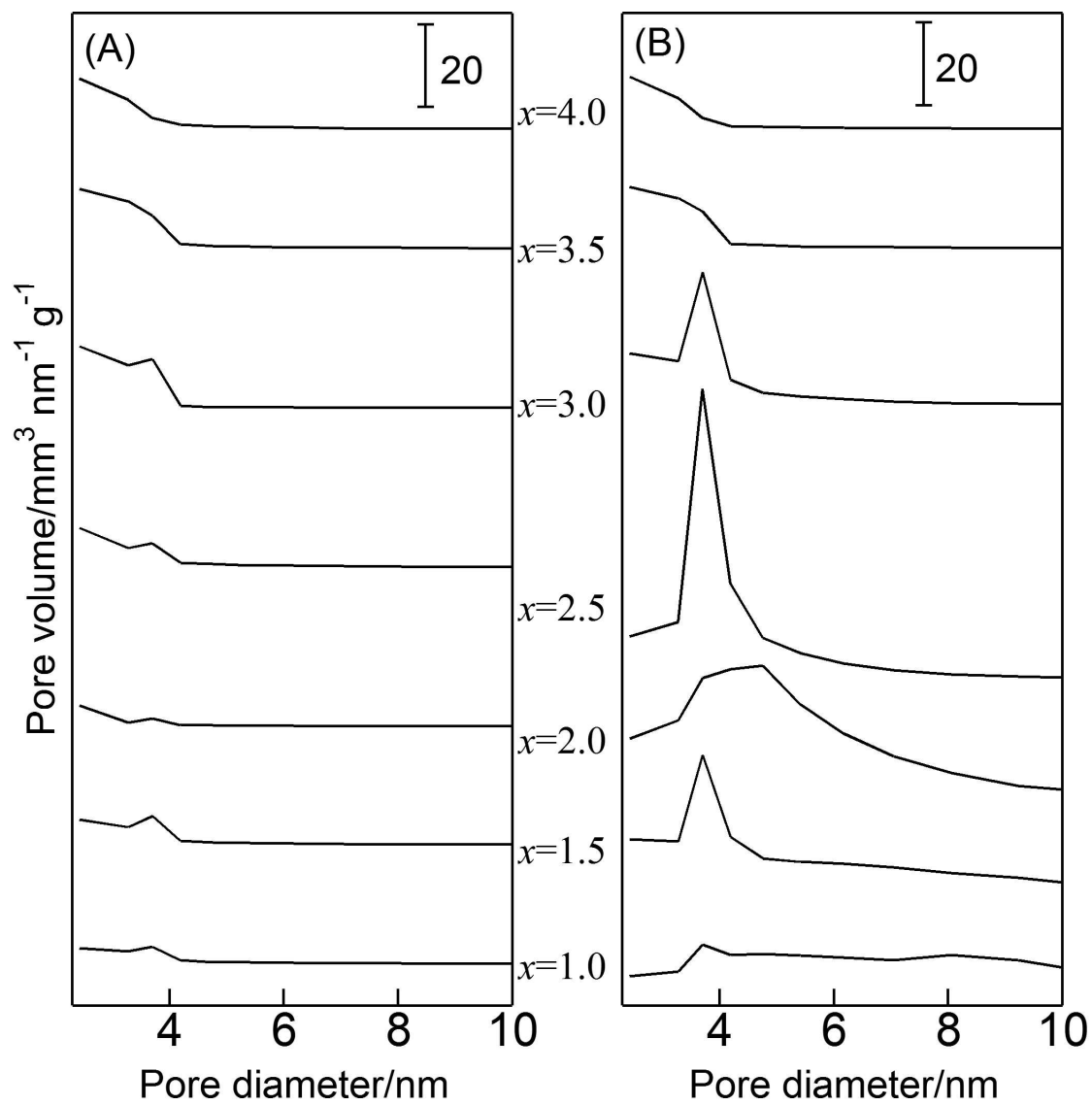
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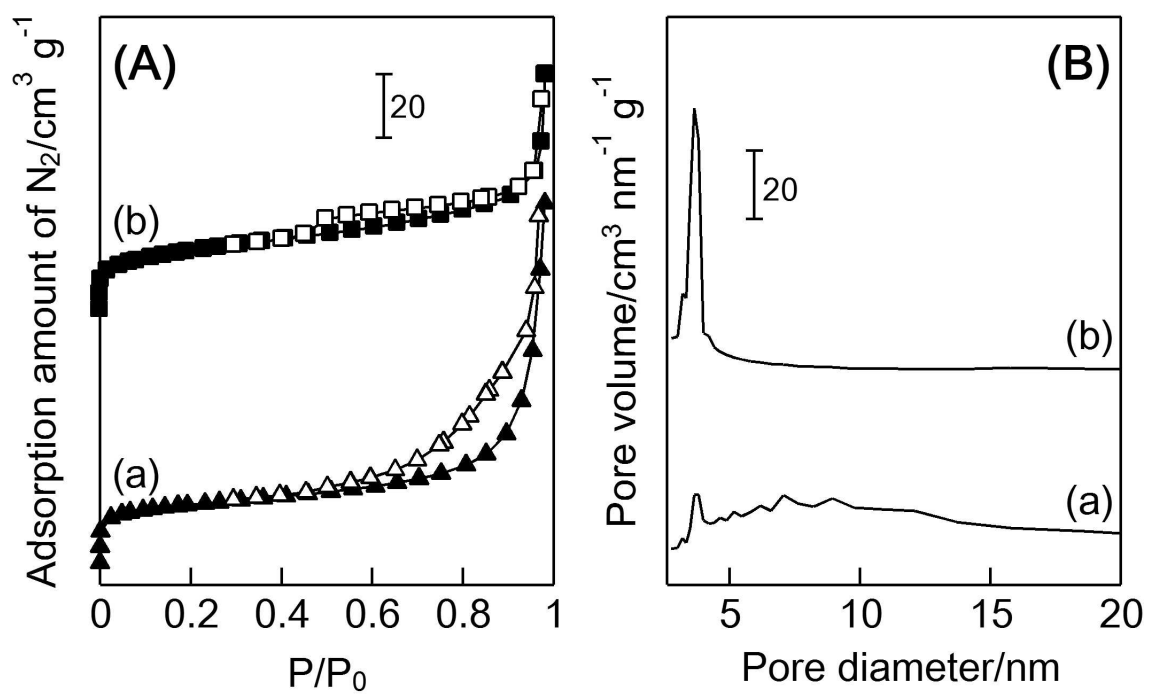


**Figure S1** Specific surface areas of **Cs<sub>x</sub>-micro** and **Cs<sub>x</sub>-bimodal** estimated from N<sub>2</sub> adsorption isotherm at 77 K. Open symbol: **Cs<sub>x</sub>-micro** and filled symbol: **Cs<sub>x</sub>-bimodal**.



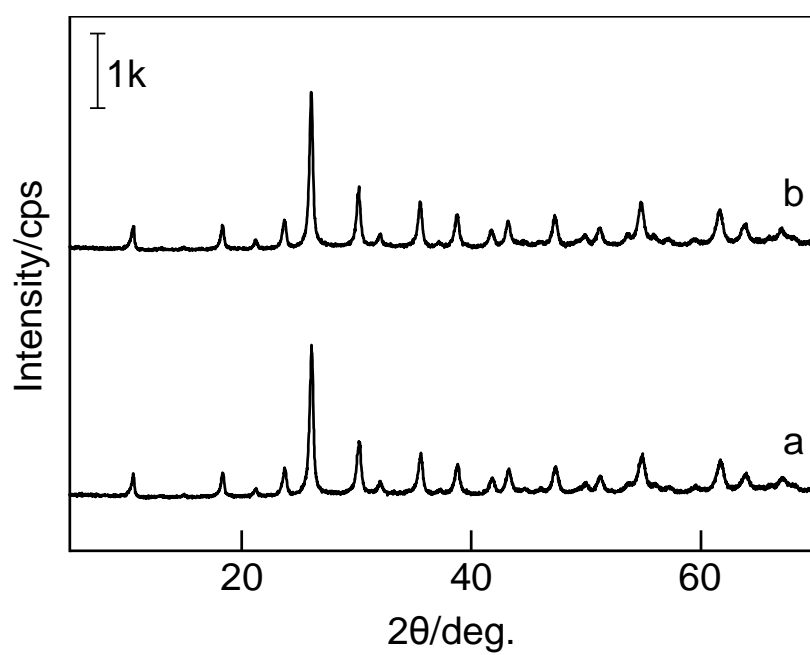
**Figure S2** Mesopore size distributions for (A) **Csx-micro** and (B) **Csx-bimodal** estimated from  $N_2$

adsorption isotherm at 77 K.

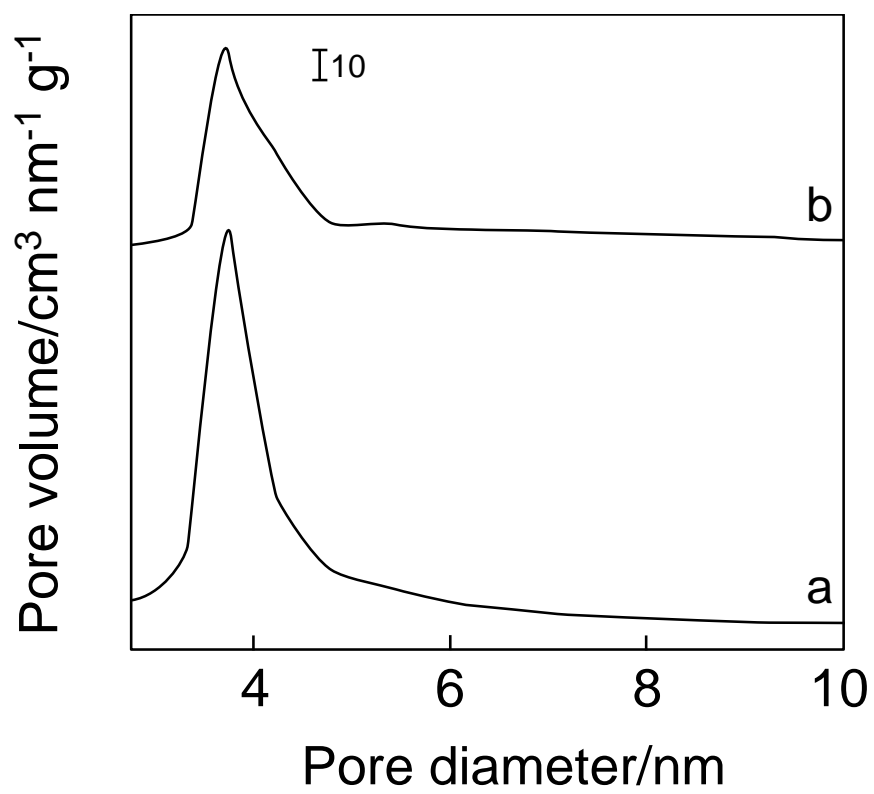


**Figure S3** (A)  $N_2$  adsorption-desorption isotherms and (B) mesopore size distributions for the materials

obtained after treatment of **Cs2.5-micro** in (a) water and (b) 1-propanol.



**Figure S4** XRD patterns for (a) **Csx-bimodal** and (b) **Csx-bimodal(H<sub>2</sub>SO<sub>4</sub>)**.



**Figure S5** Mesopore size distributions for (a) **Csx-bimodal** and (b) **Csx-bimodal(H<sub>2</sub>SO<sub>4</sub>)**.