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Reasonable harmony of Ni and Mn in core@shell-structured NiMn@SiO<sub>2</sub> catalysts prepared for hydrogen production from ethanol steam reforming

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**Reasonable harmony of Ni and Mn in core@shell-structured NiMn@SiO<sub>2</sub>  
catalysts prepared for hydrogen production from ethanol steam reforming**

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**ABSTRACT**

To improve the long term catalytic stability without catalytic deactivation during ethanol steam reforming (ESR), this study considered two main areas; the role of the redox promoter of the Mn component in a Ni-based catalyst and the stability of the core@shell structure. Five different core@shell 30Ni<sub>x</sub>Mn<sub>y</sub>@70SiO<sub>2</sub> catalysts were prepared and applied to the ESR reaction. The hydrogen selectivity was highest on the core@shell-structured 30Ni<sub>8.5</sub>Mn<sub>1.5</sub>@70SiO<sub>2</sub> catalyst compared to those of the other catalysts. During ESR, the amount of evolved CO gas, which is

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