

Control of Support Reducibility in Pd-Loaded Ceria for Enhanced Water-gas shift Reaction

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Water-gas shift reaction (WGSR) is important in the chemical industry for hydrogen production. In addition, the function of removing CO is used in devices to prevent deactivation of fuel-cells. Supported precious metal catalysts are known to be efficient for the WGSR. In particular, these catalysts are closely related to the redox mechanism because the lattice oxygens of support are used in the reaction. Therefore, the support reducibility is considered to be one of the important factors influencing the activity. Furthermore, if the reducibility of the support is controlled, more oxygen vacancies which help species containing oxygen more easily participate in the reaction can be formed on the surface. In this study, we tried to improve WGSR activity by applying reducibility-controlled support to a supported precious metal catalyst. The introduction of doping system and morphology modification were used for these methods, where the reducibility control was possible. In addition, improved performance was demonstrated through the activity measurement. Finally, we could successfully design the catalyst which showed more improved activity and reducibility.