NOx storage over Pd/CeO_2 and Pd/SSZ-13 for cold start applications

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Automobile after-treatment systems are being developed to meet the regulations. Therefore, state-of-the-art exhaust catalysts work effectively to convert most pollutants. However, pollutants released during the cold-start period, when the catalytic converts have not reached the proper operating temperature, are not effectively converted. Passive NOx adsorbers (PNA) are attracting attention as a potential solution. The PNA can store the NOx emitted during the cold-start period and then release the NOx once the catalysts are sufficiently heated to convert NOx. Metal oxides and zeolites combined with precious metals have been widely studied as the PNA materials. It is advantageous to compare metal oxide based PNAs and zeolite based PNAs because they operate in a similar manner but with different NOx adsorption and desorption mechanisms. In this work, Pd/CeO_2 and Pd/SSZ-13 are compared by various methods. Adsorption sites and mechanisms were identified using different NO/NO_2 ratios for adsorption tests. Effect of CO treatment and sulfur poisoning was also investigated on both samples.