

Studies on the Structure of Pd Supported On Zeolites by XAFS

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Pd loaded Zeolites are active catalysts for combustion of hydrocarbons. The activity strongly depends on the composition as well as on the structure of zeolites. It is expected that the valuable information, such as dispersion of Pd, can be obtained by the X-ray absorption fine structure (XAFS) measurement.

XAFS spectra were measured at room temperature in a transmission mode at the beam line BL01B1 of Spring-8. Pd/zeolites were prepared by ion-exchange method. Pd loading was 0.2-0.3 wt%. The samples calcined at 673 K under N₂ atmosphere were transferred to cells with two Kapton windows connected to a closed circulating system. For the measurement of Pd K-edge spectra two ion chambers filled with Ar and Kr were used as detectors of I₀ and I, respectively.

Figure 1 shows Fourier transforms for the k³-weighted Pd K-edge EXAFS of the Pd loaded on zeolites with different structure. An intense peak due to the Pd-Pd bond of Pd metal loaded on zeolite pores was observed at 2.5 Å in every samples. However the intensity changes with the kind of zeolites, indicating the pore structure greatly affects on the size or shape of the loaded Pd particles.

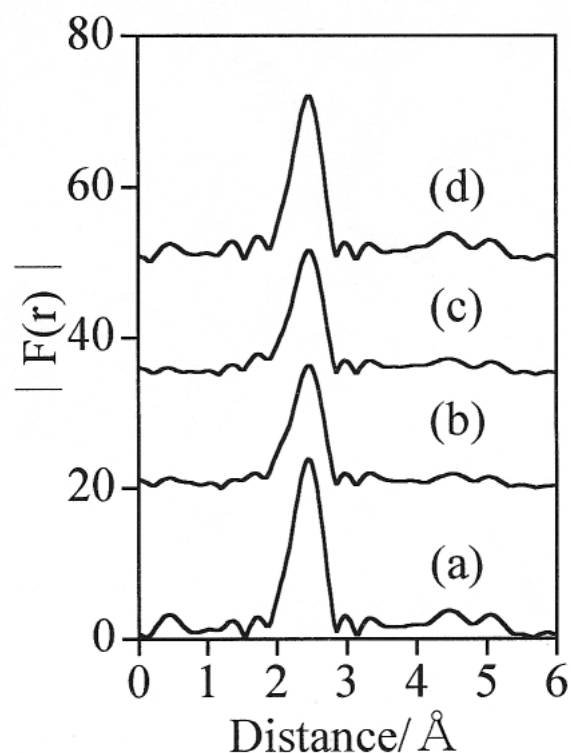


Figure 1. Fourier transforms for k³-weighted Pd K-edge EXAFS of (a) Pd/HZSM-5, (b) Pd/HM, (c) Pd/HY, and (d) Pd/H β .