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Adsorption of aromatic molecules on Si(100)(2×1)

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The interaction of unsaturated hydrocarbons with semiconductor surfaces is of considerable interest not only scientifically but also technologically. We have studied adsorption of benzene and thiophene on Si(100)(2×1) at room temperature using AES(Auger Electron Spectroscopy), UPS(Ultraviolet Photoelectron Spectroscopy), and ELS(Electron Energy Loss Spectroscopy). The coverage of the molecules has determined by APHR(Auger Peak Height Ratio) method. The results indicate that the saturation coverage of thiophene on Si(100)(2×1) is ~ 0.5. The UPS and ELS spectrum of the molecules on Si(100)(2×1) have been compared with those of free molecules. A significant bonding shift was not observed in benzene molecule, which is different from previous results for benzene molecule on metal surfaces. Semiempirical calculations have been performed to explain the experimental results and predict the adsorption state of the molecules. The preferred adsorption state of the molecules on Si(100)(2×1) turns out to be one optimized at pedestal site.