

PES Studies Using Synchrotron Radiation: $\text{CF}_2\text{Cl}_2/\text{Si}(111) 7\times 7$

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The adsorbed CF_2Cl_2 on $\text{Si}(111)-7\times 7$ surface at 30 K was studied by photoelectron spectroscopy (PES). The photoemission data was collected using synchrotron radiation at NSRRC SEYA beam line. Fig. 1 and Fig. 2 showed the series of coverage-dependence photoelectron spectra using 30 eV monochromatic photons. These series of photoemission spectra indicate that there is a dramatic change in the spectra as a result of gas exposure. The intensities of all peaks increase and the relative intensity and peak position have no change with coverage.

Due to the fact that the valence-level photoelectron spectrum of $\text{CF}_2\text{Cl}_2/\text{Si}(111)$ is similar to the gas phase spectrum, the adsorption of CF_2Cl_2 on the $\text{Si}(111) 7\times 7$ surface is physisorption. The series of coverage-dependence photoelectron spectra shows that the method of CF_2Cl_2 coverage adsorbed on $\text{Si}(111) 7\times 7$ was layer-by-layer growth.

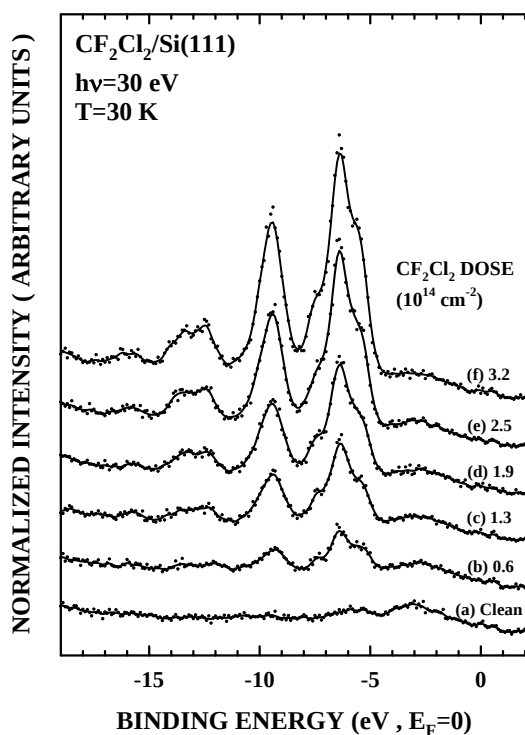


Figure 1. Series of valence-level photoelectron spectra of CF_2Cl_2 adsorbed on $\text{Si}(111)-7\times 7$ at 30 K as a function of gas exposure using 30 eV photons. The total gas exposure for each spectrum is given in units of 10^{14} molecules/ cm^2 and shown on the left of the figure.

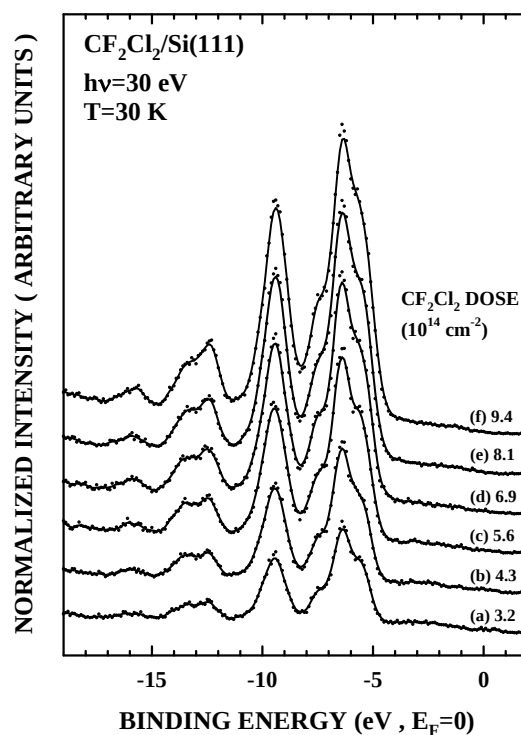


Figure 2. Series of valence-level photoelectron spectra (which extends the series of Fig. 1) of CF_2Cl_2 adsorbed on $\text{Si}(111)-7\times 7$ at 30 K as a function of gas exposure using 30 eV photons. The total gas exposure for each spectrum is given in units of 10^{14} molecules/ cm^2 and shown on the left of the figure.