

Figure S1. TPD spectrum for the $m/z = 27$, 29 , and 34 traces during decomposition of a hexanethiol SAM on Pd(111). (a): $m/z = 27$; (b): $m/z = 29$; (c): $m/z = 34$. SAM decomposition was observed to begin between 325 and 350 K. Other mass traces corresponding to hydrocarbon fragments appeared similar or showed peaks at higher temperatures.

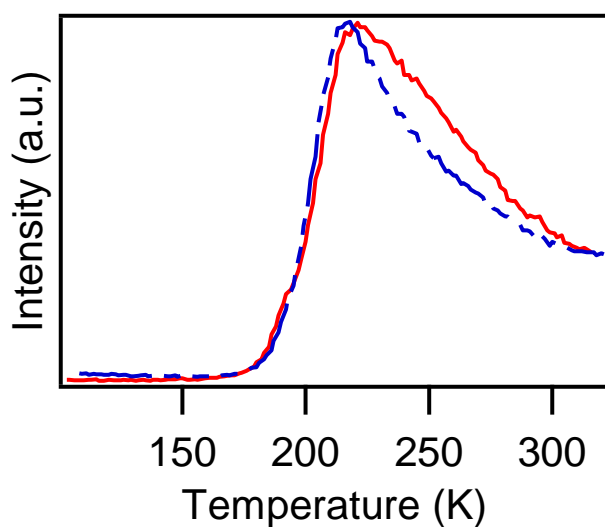


Figure S2. TPD spectra for EpB ($m/e = 39$) obtained after equivalent exposures (0.1 Torr EpB in dosing lines, see methods section of manuscript) on the C18 SAM-coated Pd(111) surface. The experiments were conducted by exposing EpB to the surface, recording a TPD spectrum, colling the sample to ~ 100 K, and immediately conducting the same exposure followed by TPD. First spectrum: red solid curve; second spectrum: blue dashed curve.

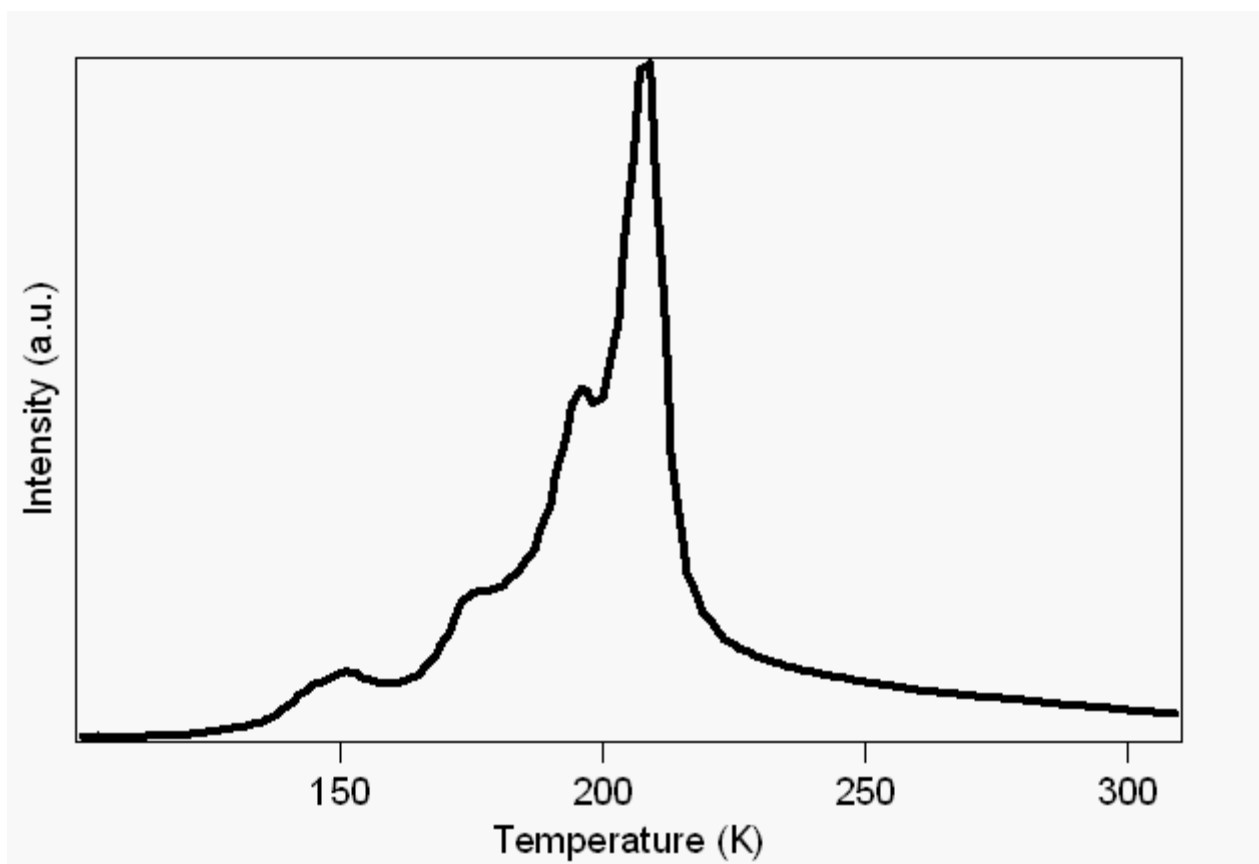


Figure S3. TPD spectrum for a large dose of EpB ($m/z=39$) onto C18 SAM coated Pd(111). Peaks associated with weakly adsorbed species including physisorbed species are observed between 150 and 200 K. Previous studies on clean Ag(110) have shown that the physisorbed state of EpB desorbs at approximately 160 K⁹.