Supporting information:

Adsorption of Water and Ammonia on Graphene: Evidence for Chemisorption from X-ray Absorption Spectra

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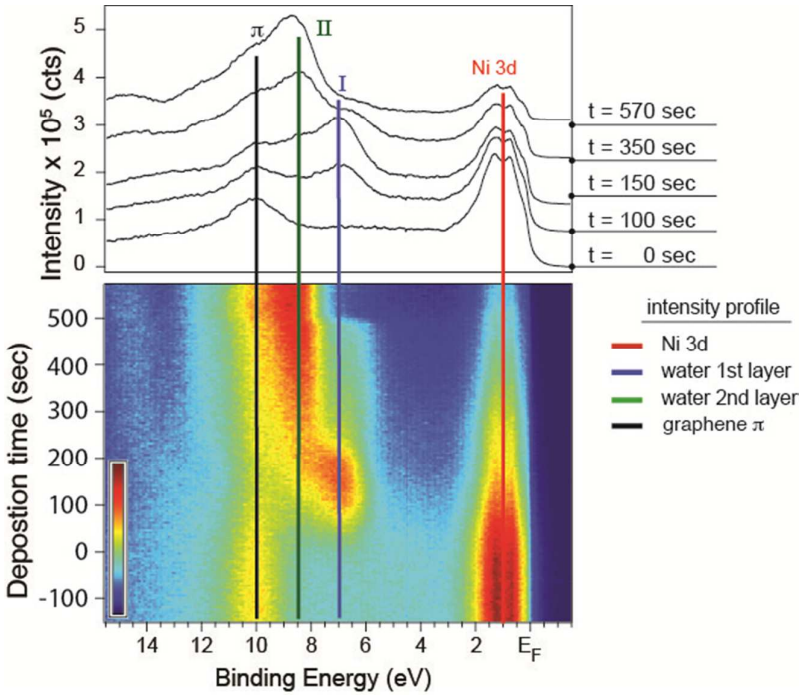

Figure S1: (top) Valence level spectra of water on graphene/Ni(111) for different exposures as indicated on the right. (bottom) Sequence of valence level spectra taken as adsorption proceeds, in a false color representation. The vertical bars indicate the location of the valence level line from water for first and second adsorbed layers, demonstrating the shift that occurs when the second layer buildup commences. Data in Figures 1 and 2 were taken from layers where the second layer signal was absent.

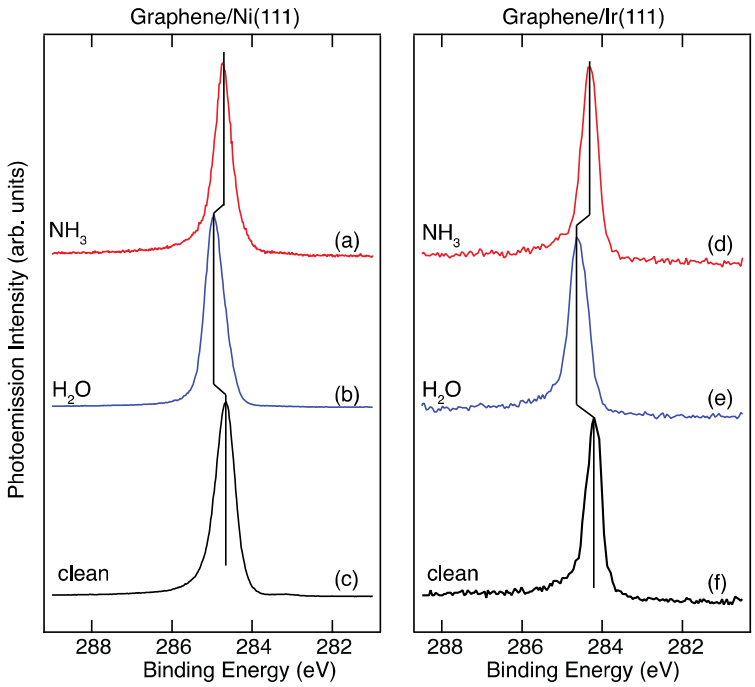

Figure S2: C1s core level spectra obtained for graphene/Ni(111) (left panel) as well as for graphene/Ir(111) (right panel) with water and ammonia adsorbed. The C1s core level state shifts upon adsorption of water to higher binding energies (ΔE_B=300 meV). In case of adsorbed ammonia this shift is almost negligible (ΔE_B < 100 meV).

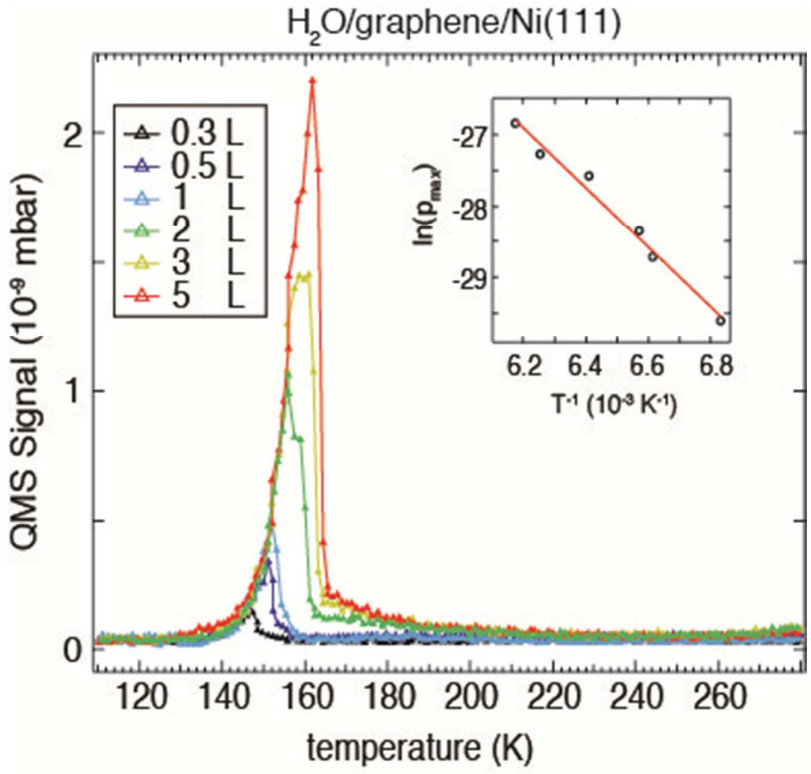

Figure S3: Thermal desorption data from water on graphene/Ni(111) used to determine the binding energy of water (E_{des} = 356 meV/molecule).