

**O 97: Invited Talk Charles Campbell**

Time: Friday 14:45–15:30

Location: HE 101

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**Energetics of Metal Atom Adsorption on Surfaces of Oxides and Polymers** — •CHARLES CAMPBELL — University of Washington, Seattle, WA, USA

Heats of adsorption of metal atoms have been measured calorimetrically on clean MgO(100), CeO<sub>2</sub>(111) and polymer surfaces. These directly probe the thermodynamics that control molecular beam epitaxy (MBE), particle nucleation and film growth. A pulse of metal vapor from a chopped atomic beam adsorbs onto an ultrathin sample's surface, causing a transient temperature rise detected by a pyroelectric polymer ribbon touching the sample. The differential heat of adsorp-

tion and sticking probability are measured versus coverage up through multilayer coverages. Complimentary information on the film morphology and electronic structure is provided by ion scattering spectroscopy, AES, work function measurements and DFT calculations. The data provide the metal-substrate bond energy (BE), the adhesion energy and the interfacial energy. Defect sites are important strong-binding nucleation sites for metal cluster growth, and these can be produced and controlled by electron and ion bombardment. For polymer surfaces, the metal atoms have two main reaction pathways in dynamic competition: diffusion below the surface, where they bind strongly to reactive functional groups, and nucleation of 3D metal clusters on the surface.