IR PHOTODEPLETION SPECTROSCOPY OF $Li(NH_3)_n$ CLUSTERS FOR n = 4-7

TOM E. SALTER, COREY J. EVANS, and ANDREW M. ELLIS, *DEPARTMENT OF CHEMISTRY, UNIVERSITY OF LEICESTER, UNIVERSITY ROAD, LEICESTER, LE1 7RH, UK.*; VICTOR A. MIKHAILOV, *UNIVERSITY OF BIRMINGHAM, EDGBASTON, BIRMINGHAM B15 2TT, UK.*.

Mass-selected infrared spectra of the uncharged metal-solvent clusters $Li(NH_3)_n$ in the N-H stretching region have been recorded using IR photodepletion spectroscopy. The bands observed in the IR spectra for $Li(NH_3)_4$ have been assigned to N-H stretching vibrations from solvent molecules located in the first solvent shell. The appearance of higher frequency N-H stretching bands for $n \geq 5$ is attributed to one or more ammonias in a second solvent shell. These data provide strong support for previous suggestions based on gas-phase photoionization measurements that the first solvation shell for $Li(NH_3)_n$ is complete at n = 4. They are also consistent with neutron diffraction studies of concentrated lithium-liquid ammonia solutions, where quasi-tetrahedral $Li(NH_3)_4$ is found to be the basic structural motif. Our spectra will be presented alongside computational predictions of the cluster spectra.