GENERATION OF INFRARED RADIATION BY STIMULATED RAMAN SCATTERING IN LIQUID AND SOLID PARAHYDROGEN

B. J. McCALL[a], A. J. HUNEYCUTT, R. CASAES, R. J. SAYKALLY, *Department of Chemistry, University of California at Berkeley, Berkeley, CA 94720*; C. M. LINDSAY, T. OKA, *Department of Chemistry, University of Chicago, Chicago, IL 60637*; M. FUSHITANI, Y. MIYAMOTO, and T. MOMOSE, *Division of Chemistry, Graduate School of Science, Kyoto University, Kyoto 606-8502, Japan*.

We report the results of our preliminary investigations into the suitability of condensed phase parahydrogen as a Raman-shifting medium for the generation of tunable infrared radiation for cavity ringdown laser absorption spectroscopy (CRLAS). We have observed the conversion of $\sim$10 ns pulses of 532 nm radiation into first-, second-, and third-order vibrational Stokes radiation in bulk liquid and solid parahydrogen after a single 11-cm pass. Surprisingly, we find that liquid-H_2 yields more efficient conversion than solid-H_2 with certain focal geometries, and that in the case of the solid, a collimated or loosely focused pump geometry is more efficient than a tight focus. We also will discuss our more recent studies of Raman shifting using the longer ($\sim$100 ns) pulses of an alexandrite laser.

[a]email: bjmccall@astro.berkeley.edu