

Abstract Submitted
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Cyanoacetylene-doped *ortho*-hydrogen and *para*-hydrogen clusters studied using rotational spectroscopy JULIE MICHAUD, WOLFGANG JÄGER, Department of Chemistry, University of Alberta, Edmonton, AB T6G 2G2 Canada — A high-resolution Fourier transform microwave spectrometer was used to measure the rotational spectra of the *ortho*H₂ – HCCCN and *para*H₂ – HCCCN dimers as well as larger (*ortho*H₂)_N – HCCCN and (*para*H₂)_N – HCCCN van der Waals clusters ($N = 2$ and greater). To generate the clusters, low concentrations of HCCCN and H₂ (normal or enriched *para*H₂) in helium are used at pressures up to 70 atm. The helium supersonic jet expansion into the spectrometer cavity/sample cell produces a collision free environment where the clusters are stabilized and studied. Varying the backing pressure, sample concentrations and/or nozzle temperature can control cluster size. The doped *para*H₂ clusters are of particular interest because *para*H₂ is suspected to exhibit the bulk property of superfluidity, similar to ⁴He. The study of the successive solvation of HCCCN with H₂ molecules may provide evidence for superfluidity in doped H₂ clusters.

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