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Fast nuclear spin conversion from *para*-H_2O to *ortho*-H_2O: A matrix isolation study in solid argon RUSSELL SLITER, MELISSA GISH, ANDREY VILESOV, University of Southern California — Single water molecules have been isolated in solid Ar matrices at 4 K and studied by ro-vibrational spectroscopy using FTIR in the regions of the ν_1, ν_2, and ν_3 modes. Upon nuclear spin conversion at 4 K, essentially pure *para*-H_2O was prepared followed by subsequent fast annealing generating ice particles. FTIR studies of the vapor above the condensed water upon annealing to T $\geq$ 250 K indicate fast re-conversion of nuclear spin to equilibrium conditions. Our results indicate that nuclear spin conversion is fast in water dimers and larger clusters, which precludes preparation of concentrated samples of para-water, such as in ice or in vapor.

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