American Mineralogist, Volume 101, pages 175–180, 2016

FTIR spectroscopy of D_2O and HDO molecules in the *c*-axis channels of synthetic beryl

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Abstract

This paper presents the results of Fourier transform infrared (FTIR) spectroscopy of a synthetic beryl, containing D_2O molecules in its *c*-axis channels, which we synthesized under hydrothermal conditions at 600 °C and 1.5 kbar. The frequencies of absorbance bands in the range of the stretching vibrations and their overtones and combination modes for D_2O and HDO molecules have been assigned for the first time. On the basis of our assignments, the absorbance bands observed for the natural beryl in the range of the OD stretching vibrations have been explained.

Keywords: Beryl; emerald; FTIR spectroscopy; H_2O, D_2O, and HDO molecules