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Vibrational spectroscopy of O-H and O-D centers in TiO_2[1] FIGEN BEKISLI, MICHAEL STAVOLA, W. BEALL FOWLER, Lehigh University — While the vibrational properties of O-H centers in TiO_2 have been studied for many years, recent experiments suggest a new picture of their behavior. In the 1970s, Bates and Perkins found a single, sharp, strongly polarized O-H line in TiO_2, and similarly for O-D and O-T [1]. On the contrary, recent studies by Herklotz *et al.* [2] find three closely spaced O-H (O-D) lines that were assigned to two different charge states of an O-H (O-D) shallow donor. We have in our possession the very TiO_2 samples studied many years ago by Bates and Perkins. We have introduced H and D into these samples and also into TiO_2 samples obtained recently. High-resolution vibrational spectroscopy performed as a function of temperature at Lehigh provides new insight into the different vibrational properties seen for O-H in TiO_2 in the 1970's and in recent studies by Herklotz *et al.* [1] J.B. Bates and R.A. Perkins, Phys. Rev. B **16**, 3713 (1977). [2] F. Herklotz *et al.*, Phys. Rev. B **83**, 235202 (2011)..

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