Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

**Determining the diffusivity of $H_i^+$ in $In_2O_3$ single crystals for over ten decades**[1] MICHAEL STAVOLA, PHILIP WEISER, YING QIN, KARLA VILLALTA, W. BEALL FOWLER, Lehigh University, LYNN BOATNER, Oak Ridge National Laboratory — Interstitial hydrogen ($H_i^+$) is an *n*-type dopant in $In_2O_3$ that has attracted attention for solar-cell applications [1]. An IR absorption line observed at 3306 $cm^{-1}$ for $In_2O_3$ single crystals annealed in an $H_2$ ambient has been assigned to the $H_i^+$ center [2]. Two types of experiments have been performed to determine the diffusivity of $H_i^+$ in $In_2O_3$. At temperatures near 673 K, experiments have been performed to determine the diffusivity of $H_i^+$ from its indiffusion depth into $In_2O_3$. At 165 K, stress can be used to produce a preferential alignment of the $H_i^+$ center. With the help of theory, the kinetics with which this alignment can be produced yield the time constant for a single jump of the $H_i^+$ center and also the diffusivity of $H_i^+$ at 165 K [3]. These data determine the diffusivity for $H_i^+$ for over ten decades! [1] T. Koida *et al.*, Jpn. J. Appl. Phys. **46**, L685 (2007). [2] W. Yin *et al.*, Phys. Rev. B **91**, 075208 (2015). [3] P. Weiser *et al.*, Appl. Phys. Lett., in press.

[1]Supported by NSF grant DMR 1160756

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Date submitted: 09 Nov 2016 Electronic form version 1.4