## Abstract Submitted for the NWS11 Meeting of The American Physical Society

Iron Chalcogenide Thin Film Deposition for Solar Absorbers RAM RAVICHANDRAN, BRIAN PELATT, School of Electrical Engineering and Computer Science, Oregon State University, ROBERT KYKYNESHI, Department of Chemistry, Oregon State University, JOHN WAGER, School of Electrical Engineering and Computer Science, Oregon State University, DOUGLAS KESZLER, Department of Chemistry, Oregon State University — Interest in the Fe<sub>2</sub>-IV-VI<sub>4</sub> system stems from a desire to fundamentally change the approach to thin-film inorganic solar absorbers by synthesizing and studying new flat-band d-element chalcogenides. Impetus for the work is provided by the band gap (Eg = 0.9 eV), excellent optical absorption ( $\alpha > 10^5 \text{cm}^{-1}$ ), and minority electron transport properties (300 cm<sup>2</sup>/Vs) of FeS2 (pyrite). Fermi level pinning, however, results in a low open circuit voltage (Voc) limiting the absorber potential of FeS<sub>2</sub>. The olivines  $Fe_2SiS_4$  and  $Fe_2GeS_4$  are promising candidates for realizing the desired properties.  $Fe_2GeS_4$  thin films are fabricated via RF sputtering and demonstrate a band gap of 1.5 eV with an optical absorption  $\alpha > 10^5 \text{cm}^{-1}$  at Eg +1 eV. These ternaries provide a new entry point for development of highly efficient thin-film solar absorbers.

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