Abstract Submitted
for the NWS06 Meeting of
The American Physical Society

Quaternary p-type sulfide-fluoride transparent conductor: BaCuSF[1] ROBERT KYKYNESHI, JANET TATE, Dept. Physics, Oregon State University, CHEOL-HEE PARK, DOUGLAS KESZLER, Dept. Chemistry, Oregon State University — Conductive thin films of wide band-gap BaCuSF were prepared by pulsed laser deposition and post-annealing in a H_2S. High conductivity (up to 500-1800 S/cm), carrier density ($\sim 10^{21}$ cm^{-3}), and mobility (0.7-4 cm^2/Vs) were measured for the undoped and potassium-doped films, attributed to the textured crystalline structure at low processing temperature (T=235°C). The positive Seebeck coefficient (+5 μV/K) identifies holes as majority mobile carriers in this degenerate semiconductor. The conductivity can be significantly reduced ($\sim 10^5$ S/cm) by higher temperature annealing, with observed higher transparency in the visible and near-IR spectrum. The absorption coefficient of the high conductivity BaCuSF films is compared to that of transparent conducting oxides of the delafossite structure.

[1]Supported by the NSF under DMRo245386.

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Date submitted: 21 Apr 2006 Electronic form version 1.4