Abstract Submitted
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Defect state investigation of amorphous silicon carbide using electron spin resonance and photothermal deflection spectroscopy[1] BRIAN J. SIMONDS, J. GALLON, Colorado School of Mines, TINING SU, Colorado Schoo of Mines, ARUN MADAN, MV Systems, P. CRAIG TAYLOR, Colorado School of Mines — Amorphous silicon carbide alloys are being discussed as a possible top photovoltaic layer in photo electro-chemical cells used for water splitting. In order to be used as such, it is important that the effect of carbon concentration has on bonding, and thus the electronic and optical properties, is well understood. Electron spin resonance experiments, under varying experimental conditions, were performed to study the dangling bonds, which were found to be dominantly at the silicon atoms in these films. At room temperature, the spin count densities varied between 10^{16} and 10^{18} spins/cm^3. Photothermal deflection spectroscopy experiments were also performed in order to look at defects resulting in sub band-gap absorption where absorption is defined proportional to $e^{E/E'}$ with E' the inverse slope of the Urbach tail. We report slopes of between 70 meV to 83 meV. These increases in inverse slope correlate with increases in spin density.

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