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Time-Domain Thermoreflectance Measurements of Thermal Transport in Amorphous SiC Thin Films BRIAN DALY, DONALD HONDONGWA, Vassar college, SEAN KING, Intel Corporation — We present ultrafast optical pump-probe measurements of thermal transport in a series of amorphous SiC samples. The samples were grown on Si wafers by plasma enhanced chemical vapor deposition utilizing various combinations of methylsilanes and H_2 and He diluent gases. The sample films were well characterized and found to have densities (1.3 – 2.3 g cm^{-3}) and dielectric constants (4.0 – 7.2) that spanned a wide range of values. Prior to their measurement, the samples were coated with 40-70 nm of polycrystalline Al. The pump-probe measurements were performed at room temperature using a modelocked Ti:sapphire laser that produced sub-picosecond pulses of a few nJ. The pulses heat the Al coating, causing a transient reflectivity change. As the Al film cools into the SiC film, the reflectivity change can be measured, giving a measure of the thermal effusivity of the SiC film. We then extract values for the thermal conductivity of the SiC films and find that it varies from less than half of the thermal conductivity of amorphous SiO_2 for the lower density materials to somewhat larger than amorphous SiO_2 for the highest density films.

Brian Daly
vassar college

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