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Experimental Studies of Transport Properties of Novel Amorphous Fe-Tb-Dy-O Thin Films ALEXANDRA WATERS, TATIANA ALLEN, Univ of Tennessee, Chattanooga, HUMAIRA TAZ, RAMKI KALYANARAMAN, Univ of Tennessee, Knoxville — Novel amorphous material Fe-Tb-Dy-Oxide shows a remarkable combination of very high optical transparency, electrical conductivity, and Hall mobility. Material properties can be tuned by changing the R-value, the atomic ratio of iron to the two lanthanides, during the deposition. This makes the material a potential candidate for a wide range of applications in energy conversion, electronics, photonics, and spintronics. This work focuses on the transport properties of the samples with R-values between 6 and 12, which correspond to 8 - 14 % of lanthanides in the iron oxide matrix. Films were grown by ion beam evaporation, then some films were annealed in various environments. Electrical resistivity, Hall Effect, and magnetoresistance were measured in the Van-der Pauw geometry at T=300 K in magnetic fields up to 13 kGs. The samples were heated to 700K, while resistivity and Hall Effect were monitored in-situ. After the samples cooled to T=300K, the transport properties were re-measured. This protocol was repeated for as long as the electrical contacts of a given sample remained linear. We will discuss the effect of the initial annealing on the sample properties as well the evolution of the transport properties of as-deposited samples as a result of the thermal cycling.

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