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Redesign of an AC Magnetic Susceptometer for smaller samples[1]
ANDRES VARGAS, RYAN FUKUDA, SMITHA SUNNY, PEI-CHUN HO, California State University, Fresno — A new AC magnetic susceptometer that measures samples of the 10 mg range has been built to improve upon our previous model in design and materials. The AC magnetic susceptometer will be measuring the magnetic susceptibility of our samples. It is made up of a sample holder, a primary coil, and a secondary coil. A current is inputted to the primary coil which provides an applied AC magnetic field. The sample lies at the center of one of the solenoids of the secondary coil and becomes polarized due the applied magnetic field. The polarization will cause an induced voltage on the secondary coil which is directly proportional to the sample's magnetic susceptibility. The new AC magnetic susceptometer contains roughly 1.30 and 1.32 more windings than the previous primary and secondary coil respectively. The improvements of the new AC magnetic susceptometer will result in a smoother and more accurate data curve. We will be using our AC magnetic susceptometer to determine a compound's phase transition, which is given by a sharp change in the induced voltage at a critical temperature. We tested our new susceptometer using an 11 mg sample of Gd. The sharp change of Gd's magnetic susceptibility at the critical temperature qualitatively agrees with our previous AC magnetic susceptometer data.

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