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Magnetic Quenching of Plasmon-photonic Activities in Fe_3O_4-Elastomer Composite[1] DUSTIN HESS, DANHAO MA, DEREK CAPLINGER, KOFI ADU, Department of Physics, The Pennsylvania State University, Altoona College, Altoona, PA 16601, USA, RICHARD BELL, Department of Chemistry, The Pennsylvania State University, Altoona College, Altoona, PA 16601, USA — We present preliminary results on the effect of particle size on the optical response of Fe_3O_4-silicone elastomer composite in the presence of external static magnetic field. The optical response of composites containing 2wt% of Fe_3O_4 particles of diameter range 20-30nm, 40-60 nm and d<500nm in silicone elastomer were measured using a PerkinElmer lambda 950 UV/vis/NIR spectrometer. We observed a systematic redshift in the optical response of composites containing nanoparticles (20nm-30nm and 40-60nm) with increasing static magnetic field strength, which saturates near 600 Gauss. However, we observed a dramatic suppression to near quenching of the plasmonic activities in the micron size particle (d < 500nm) elastomer composites. This occurred even at very low applied static magnetic fields, suggesting particle size limitations in modulation of plasmon-photonics by external magnetic field.

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