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Tunable Acoustic Attenuation by Dilute Suspensions of Oblate-Spheroidal Ferromagnetic Particles Under an External Magnetic Field: An Experimental Study WUHAN YUAN, JERRY SHAN, LIPING LIU, Rutgers University — The microstructure of suspensions of spheroidal ferromagnetic particles with subwavelength size can be controlled by an external field, making it possible to develop novel broadband acoustic materials with anisotropic and tunable acoustic properties. In this study we experimentally show that dilute suspensions of nickel microflakes exhibit a 20% to 30% change in attenuation coefficient at MHz frequencies upon changing the direction of an external magnetic field, at particle volume fractions of only 0.5%. Further investigations are conducted to study the mechanism behind this anisotropy. The effects of particle aligning and chaining are analyzed with the aid of optical transmission measurements. By making comparison to suspensions of spherical particles, we show that the ellipsoidal shape of the nickel microflakes plays an important role in tunable acoustic properties of these suspensions.

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