Core-shell Structured Carbonyl Iron Microspheres Prepared via Dual-step Functionality Coatings and Their Magnetorheological Response

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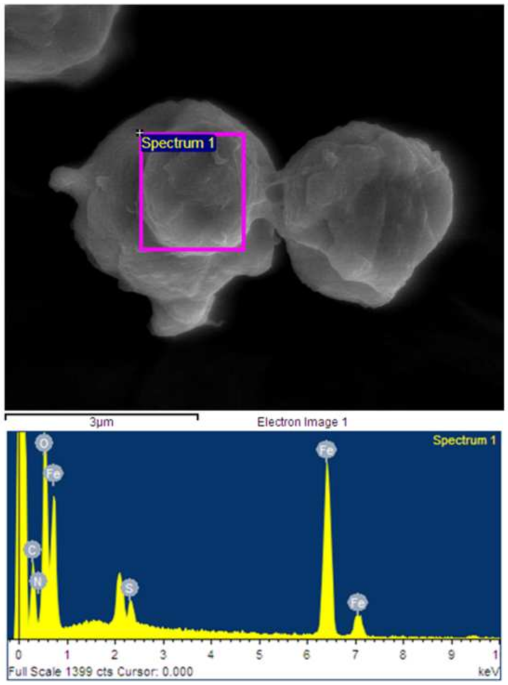

Figure S1: EDS spectra of PANI coated CI particles.

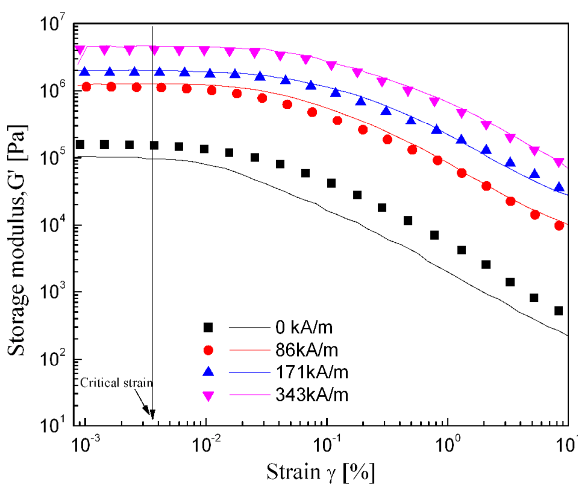

Figure S2: Amplitude sweep of pure CI (solid line) and MWCNT/PANI/CI (symbol) suspensions under different magnetic field strengths.

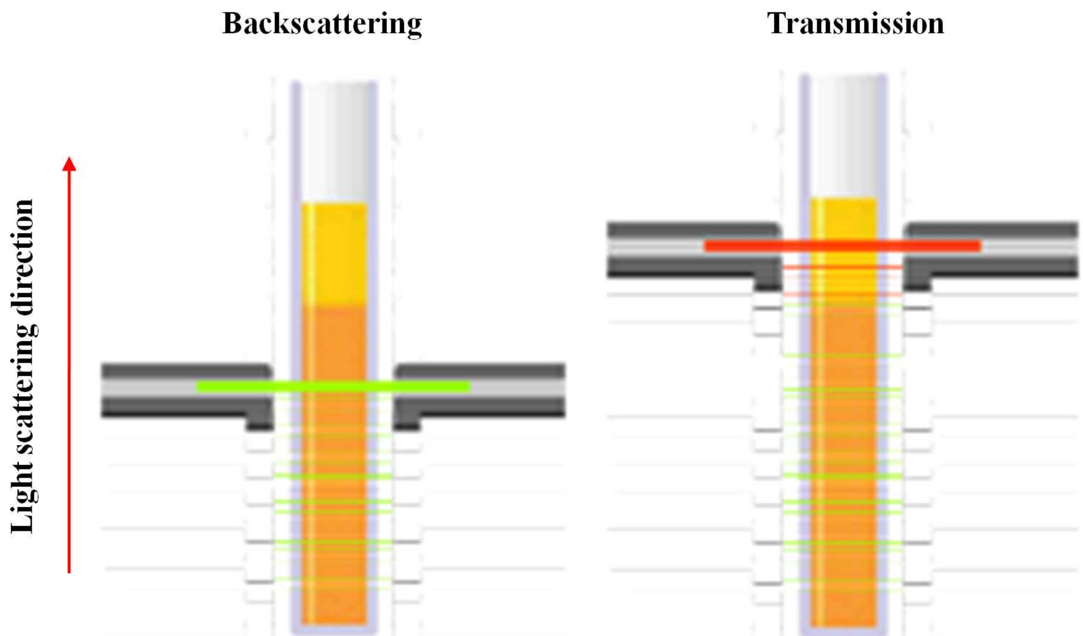

Figure S3: Scan mode of the Turbiscan Lab.

The employed Turbiscan (Fomulation, Turbiscan lab) equipment uses Multiple Light Scattering technique to detect and determine the destabilizing phenomena happened in dispersed system which can be concentrated or dilute. The Turbiscan lab reading head consists of pulsed near infrared light source (880 nm) and two synchronous detectors. The transmission detector receives the light going out of the sample at 0 º from the incident beam, while the backscattering detector receives the light scattered by the sample at 135 º from the incident beam. The results from transmission are presented as the sedimentation profile *i.e.*, delta transmission flux *versus* time. The backscattering (BS) and transmittance (T) of incident light are measured by calculating transport mean free path of photons (l^*) throughout the medium. Based on Mie theory, the BS and T can be obtained for a concentrated suspension as follows:

$$BS \approx \left(\frac{1}{\ell^*}\right)^{1/2}$$

(1)

$$T = \exp\left(\frac{-r}{\ell}\right)$$

(2)

Here, *r* is an internal radius of a measurement cell. The photon transport mean free path (l*) and photon mean free path (l) are defined as:

$$\ell^* \approx \frac{2d}{3\varphi\ (1-g)Qs}$$

(3)

$$\ell = \frac{2d}{3\varphi Qs}$$

(4)

where *d*, φ, *g*, and *Q*s denote a particle mean diameter, the volume fraction of a dispersed phase, asymmetry factor, and scattering efficiency factor, respectively.