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Acoustic and Ultrasonic Spectral Evolution in Pre- and Post-Damage Self-Healing Poly (Ethylene Co-Methacrylic Acid) Ionomer Samples JONATHAN BUCKLEY, KENNETH PESTKA II, Longwood University, STEPHEN KALISTA, Department of Biomedical Engineering, Rensselaer Polytechnic Institute — We measured the pre- and post-damage resonant spectra of several self-healing ionomer samples composed of poly (ethylene co-methacrylic acid) (EMAA). The post-damage results indicate significant time-dependent variation in the acoustic and ultrasonic resonant spectral waveforms of these self-healing samples. These results are consistent with other recent experiments that demonstrate time evolution of resonant frequencies and associated quality factors within samples of post-damage EMAA ionomers. However, in our experiments it was found that, in some circumstances, the quality factors and associated resonant frequencies can exhibit time-dependent variation both before and after external damage. By quantifying time-dependent variations in the spectra of undamaged samples, including quality factor, resonant frequency and spectral waveform, we demonstrate a method to isolate changes in the resonant spectra that are present solely due to the post-damage healing behavior of these EMAA ionomers.

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