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Synthesis of Piezoelectric Polymer Films ERIC NELSON, JASON LERNER, AHMED HAMZAH, VAMAN NAIK, University of Michigan, Dearborn — The significance of polymer films in the biomedical and engineering industries continues to rise. Polyvinylidene difluoride (PVDF) is a chemical compound used to synthesize these polymer films. PVDF films exhibit piezoelectric properties; therefore, when pressure is applied to the PVDF film, it generates an electric charge. This property allows PVDF films to be utilized for a broad range of applications including pressure sensors, electronic switches, ultrasounds, blood pressure detectors, and artificial skins amongst others. We are currently interested in producing PVDF polymer films with strong piezoelectric effects and determining how modifications during synthesis affect their properties. The characterization of the polymer films has been accomplished through Fourier Transform Infrared Spectroscopy (FTIR), Raman Spectroscopy, and X-ray Diffraction (XRD). We found that introducing Fe_3O_4 and $\text{Co}_x\text{Fe}_{3-x}\text{O}_4$ magnetic nanoparticles, changing the annealing duration, and varying the annealing temperature altered the properties of the PVDF films. Understanding how the synthesis method of a polymer film can influence its piezoelectric properties is a first step in the development of PVDF film technology.

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