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Remote fluorescence-based sensing of elastic thin-film elastic moduli AH YOUNG JEE, University of Illinois at Urbana Champaign, MINYUNG LEE, Ewha Womans University — The fluorescence lifetime of dyes embedded within thin polymer films is sensitive to the local mechanical environment. Here we show that this enables direct measurement of elastic properties of thin films and small samples whose investigation by conventional macroscopic mechanical characterization would not be possible. The specific example of poly(ethylene oxide) (PEO) and its nanocomposite thin films is highlighted. The method is also validated by comparison to a family of other polymers of known macroscopic moduli. Being simple, rapid, and reliable, we propose that this analysis can in principle apply generally to a broad class of soft materials and other polymer multilayer films.

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