

Abstract Submitted
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High Fidelity Detection of Defects in Polymer Films using Surface-Modified Nanoparticles ALAMGIR KARIM, MATTHEW BECKER, CHAITANYA PRATIWADA, Dept. of Polymer Engg., University of Akron, Akron, OH, USA, UNIVERSITY OF AKRON TEAM — Surface defects are ubiquitous for most thin films, yet their systematic detection poses one of the most difficult challenges even to modern day technology. Polymer thin films are no exception to these problems. We address this issue by developing a novel, efficient method for the optical detection of surface topographical features using fluorescent nanoprobe, which are surface-modified CdSe quantum dots whose ability to detect surface features can be tuned via size and chemical properties. We have successfully applied this approach to detect numerous types of artificial and natural defects in polymer films including lines, pinholes, sharp edges, and chemically variant defect surfaces. This method can elucidate the surface structure of large areas in a minimal amount of time. It is estimated that this new method will decrease imaging time compared to traditional imaging methods like AFM and SEM by 50 fold. Our defect detection approach could be applicable for many problems where polymers are used as a component in hybrid nanomaterial films

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