

Interfacial fracture of perovskite light emitting devices

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Research by SUNY Polytechnic Institute (SUNY Poly) President Dr. Winston Soboyejo and peers at Worcester Polytechnic Institute (WPI) titled, "[Interfacial fracture of Perovskite Light Emitting Devices](#)," has

been published in the journal *Extreme Mechanics Letters*.

The study provides critical insights into the fracture behavior of Perovskite Light Emitting Devices (PLEDs), emphasizing the importance of interfacial toughness in [device](#) performance. This can influence future materials and interface engineering strategies in optoelectronic devices.

Moreover, understanding the interfacial fracture toughness of PLEDs can guide the design of more robust devices by improving the adhesion between layers and reducing defect propagation. This can lead to enhanced performance and durability of PLEDs.

Dr. Soboyejo first learned about the mechanics of contact-induced failure and the mechanics of interfacial failure about 30 years ago. In the early 2000's, he started working with a former Princeton colleague (Steve Forrest) and two former Ph.D. students (Yifang Cao and Changsoon Kim) on a pressure-assisted method for the fabrication of light emission devices.

The insights from the combined experimental and analytical/computational studies resulted in a patented cold-welding method for the fabrication of organic light emission devices, which was subsequently licensed by Samsung for the manufacturing of LEDs.

Subsequently, Dr. Soboyejo worked with a Princeton electrical engineering Ph.D. student (Tiffany Tong) on the study of interfacial failure in organic light emitting devices about 15 years ago.

This work developed the experimental approaches that were used in this study, in which he supervised a former WPI Ph.D. student (Jaya Cromwell) and a former WPI Ph.D. [student](#) and post-doc (Reisya Ichiwani) in a study of interfacial failure and toughening of a new

generation of light emitting devices.

The insights from this most recent work have already resulted in a published patent for the pressure-assisted fabrication of next generation of [light](#) emitting devices and [solar cells](#) in the work by Dr. Soboyejo's former Ph.D. students and postdocs (Dr. Kehinde Oyewole, Dr. Deborah Oyewole and Dr. Lara Oyelade) from the African University of Science and Technology (AUST) and WPI, and Jaya Cromwell and Reisia Ichiwani from WPI.

More information: J. Cromwell et al, Interfacial fracture of Perovskite Light Emitting Devices, *Extreme Mechanics Letters* (2024). DOI: [10.1016/j.eml.2024.102201](https://doi.org/10.1016/j.eml.2024.102201)

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