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Structure-property correlation of thin films for energy applications

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South Africa and the rest of the world have the challenge of a rapidly growing demand for energy. This leads us to seek out a low cost, high efficiency technology for energy generation which is easily scalable, such as hybrid organic-inorganic perovskite (HOIP) as well as other thin film energy materials. ^[1,2,3,4] HOIPs are held back by their limited stability, to which incremental progress has been made in literature. ^[3,4,5,6,7] As a preliminary study we investigated some HOIP devices and the thin films they are composed of, using X-Ray Reflectometry (XRR) and Electrochemical Impedance Spectroscopy (EIS), among other techniques for correlation between transport and structural properties. For a layered device XRR provides an interference pattern that is modeled to determine layer thickness, roughness and density. EIS can provide information about the impedance of the layers and the interfaces within a device; this is also determined by developing an appropriate model. This information can then be correlated to physical characteristics and/or processes. Selected results from our studies to date will be posted.

References

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Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

MSc

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

No

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