X-ray Photoelectron Spectroscopy for investigation of hybrid perovskite solar cells

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As the demand for high performance materials increases, so does the importance of surface engineering. Many of the problems associated with modern materials, like e.g. in hybrid perovskite solar cells, can be solved only by understanding the physical and chemical interactions that occur at the surface or at the interfaces of a material’s layers. An X-ray Photoelectron Spectroscopy (XPS) is a perfect method to be used for studying the surface and interface properties of materials \cite{Das2016, Sowinska2016, Sowińska2016, Das2015}. XPS allows investigating not only the chemical and electronic states of elements within a material, but also an overlayer growth mode and its thickness (e.g. atomic layer deposition (ALD) growth of buffer and encapsulating layers in perovskite solar cells) as well as the elemental composition and empirical formula can be determined. In this work, we are presenting our recent laboratory- and synchrotron-based XPS investigations of the CH\textsubscript{3}NH\textsubscript{3}PbI\textsubscript{3}-based perovskite solar cells and we are demonstrating the potential of the XPS method for understanding physical and chemical interactions that occur at the surface and/or interfaces of a material’s layers in the perovskite solar cells.

References

\cite{Das2016}
\cite{Sowinska2016}
\cite{Sowińska2016}
\cite{Das2015}