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# Investigating interfaces and spinterfaces of organic radicals by X-ray based spectroscopies

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Using soft X-ray spectroscopies, performed also at synchrotrons, we investigate thin film processes, surfaces and interfaces at the nanoscale, when organic radicals are deposited on metal and metal oxide surfaces. We suggest how to design organic radicals bearing in mind the thermodynamic factors that govern thin film stability, with the purpose of obtaining not only a chemically stable radical, but also stable thin films. We investigate the thermal and air stability of the deposited films, and we explore the influence of the surface/radical chemical bond and the role of surface defects on the magnetic moment at the interface.
Our work shows that the use of X-ray based techniques represents a powerful approach to reveal the mechanisms governing complex interfaces, such as radical/metal and radical/metal-oxide where it is important to describe both charge and spin behavior (spinterfaces).
A deep understanding of stable radical/inorganic spinterfaces may open the way to use radicals in solid state devices, or as quantum bits with dedicated configurations, as proposed for other molecular quantum bits, and in spin-based electronics.

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