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# Growth of cobalt iron oxides on Ru(0001) by real-time LEEM and real-time PEEM

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The current quest for spintronic devices might benefit from taking advantage of the properties of highly perfect materials. For example, spinels are oxides with interesting properties that suggest many possible applications based on them. However, growth defects are ubiquitous in spinel thin films. A possible path to obtain highly perfect spinel nanostructures is through growth by oxygen assisted molecular beam epitaxy stopping the growth before island coalescence, where each spinel crystal arises from a single nucleus. We have successfully employed it to grown various spinel oxides on Ru(0001) single crystals and films, including mixed Ni-Fe [1] and Co-Fe spinels [2]. In particular we have used low-energy electron microscopy to follow the growth at several Co/Fe ratios, complementing it with x-ray absorption spectroscopy analysis of the grown films [3]. However, in a complex multicomponent system, LEEM cannot track the composition evolution of the growth front. In order to follow that evolution, we have acquired PEEM images during the growth at Fe and Co L23 edges by means of photoemission electron microscopy [4]. In this way, we have seen how the composition of the different phases present in the films evolve with coverage.

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