

Characterisation of functional coatings using large scale facilities

E. Søndergård :

Laboratoire de Surface du Verre et Interfaces, UMR 125CNRS/Saint-Gobain, Aubervilliers,
93303 cedex, France

Phone: 00 45 (1) 48 39 57 51 e-mail: elin.sondergard@saint-gobain.com

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Thin films and multi-layers find a broad application range in areas ranging from optical filters to conductive transparent coatings. The investigation of the link between the properties of the film and structure is a very active research area both in terms of fundamental and applied science. In many cases the coatings are very thin and not well crystallized making characterisation a considerable challenge. In the most complex cases the active part of the stack is buried hindering the use of conventional characterisation tools. Finally, certain functional properties of the coatings may only be present in ambient conditions and their study calls for *in-situ* studies in a controlled environment. Therefore, either synchrotron or neutron based techniques can be mandatory to analyse the structure or chemical nature. I will show examples of the characterisation of multilayers and surfaces of interest for the glazing industry and show how large scale facilities were used to give pertinent information on specific scientific questions on the interfacial chemistry and structure. The examples concern metal/oxide interfaces or transition metal oxides coatings or multi-layers investigated by techniques like high pressure photoemission, neutron reflectometry, high kinetic energy photo emission and x-ray absorption.