Surface oxide films : growth, chemical composition, structure investigated by surface analytical techniques (XPS, ToF-SIMS, STM, STS) and recent progress in modeling

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The citation of the pioneering work of Clive Clayton in studying passive oxide films by XPS will be the starting point of this lecture in which I will review major steps in the research leading to a better understanding of passivity of metals and alloys.
The various points that will be addressed include :

- Chemical composition, chemical states and thickness of passive films studied by XPS
- Nanostructure of passive films studied *in situ* by scanning tunneling microscopy (STM)
- Recent development in the investigation of the electronic structure of passive films using scanning tunneling spectroscopy (STS)
- Recent progress in application of dual beam ToF-SIMS to corrosion research
- The comparison of a general kinetic model of oxide growth [1] with experimental data [2].

References

1 - Antoine Seyeux, Vincent Maurice, and Philippe Marcus, Journal of The Electrochemical Society, 160 (6) C189-C196 (2013)
2 -Kirsten Leistner, Charles Toulemonde, Boubakar Diawara, Antoine Seyeux, and Philippe Marcus, Journal of The Electrochemical Society, 160 (6) C197-C205 (2013)