

# Wim G Sloof

Associate Professor - Principal Investigator



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## Research interests

Relations between properties, chemistry and structure of various metal and ceramic coatings on metallic substrates.

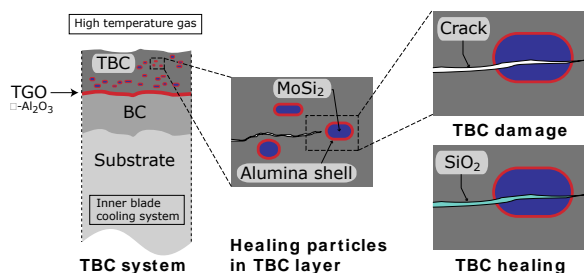
High temperature thermal barrier coating systems, oxidation of metals, protective coatings on high strength steels and self-healing materials.

Electron Microscopy, Electron Backscattered Diffraction, X-ray Micro Analysis, Mass Spectroscopy, Auger and X-ray photoelectron spectroscopy and Ellipsometry

## Surface and Interface Research

### Recent Research activities

- Selective oxidation of advanced high strength steels
- Modelling adhesion
- Self healing MAX phase ceramics
- Self healing Thermal Barrier coatings
- Spark Plasma Sintering of novel materials



Schematic of crack-healing mechanism in a thermal barrier coating (TBC) with encapsulated Mo-Si based particles. The TBC system comprises a superalloy substrate with a bond coating (BC), which produces a thermally grown oxide (TGO) during service, and the modified yttria-stabilized zirconia (TBC). Upon oxidation of a cracked Mo-Si based particle, silica (SiO<sub>2</sub>) fills the crack over a long distance.

### Key publications 2015

R. Pillai, W.G. Sloof, A. Chyrkin, L. Singheiser, W.J. Quadakkers. *A new computational approach for modelling the microstructural evolution and residual lifetime assessment of MCrAlY coatings*, Mater High Temp 32 (2015) 57-67.

A.S. Farle, C. Kwakernaak, S. van der Zwaag, W.G. Sloof, *A conceptual study into the potential of M<sub>n+1</sub>AX<sub>n</sub>-phase ceramics for self-healing of crack damage*, J European Ceramic Soc 35 (2015) 37-45.

Z. Derelioglu, A.L. Carabat, G.M. Song, S.V.D. Zwaag, W.G. Sloof, *On the use of B-alloyed MoSi<sub>2</sub> particles as crack healing agents in yttria stabilized zirconia thermal barrier coatings*, J European Ceramic Soc 35 (2015) 4507-4511.

A.L. Carabat, S. van der Zwaag, W.G. Sloof, *Creating a Protective Shell for Reactive MoSi<sub>2</sub> Particles in High-Temperature Ceramics*, J American Ceramic Soc 98 (2015) 2609-2616.

### Other Achievements

Visiting professor at Harbin Institute of Technology, China.

International Advisory board of the Journal "Oxidation of Metals", Springer, New York.

Member of the scientific advisory board of the E-MRS fall meeting symposium on self-healing materials, Warsaw, Poland.

