

Dr Mary Taylor

Post Doctoral Researcher

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About

Mary Taylor is a post doctorate researcher in the department of Metallurgy and Materials. She is active in the field of high temperature oxidation of alloys and coatings. She has published work on the chemical failure of coating systems and creep testing of coatings. She has also developed and patented an a chromia forming thermal barrier coating system.

Qualifications

- PhD in Plasma-Spraying Hydroxyapatite Coatings, 1995.
- MEng in Materials Engineering, University of Birmingham, 1990.

Biography

On leaving school Mary Taylor trained and worked as a medical physics technician in the NHS. She began her undergraduate studies in the department of Metallurgy and Materials at the University of Birmingham and qualified with an MEng in Materials Engineering in 1990. She combined her medical physics knowledge and practical experience with her degree subject during her PhD studies in the plasma-spraying of hydroxyapatite (the artificial bone mineral) for hip implants. She was awarded a PhD in 1995.

Following this Mary turned her abilities to producing plasma-sprayed coatings for high temperature applications and has continued to work in that field ever since. She has investigated the effects of high temperature oxidation on the chemical failure of alloys substrates and coatings, development a technique and obtained measurements of the creep properties of coating materials and has developed a thermal barrier coating for use in corrosive environments.

Teaching

Undergraduate:

- Supervision on Final year projects

Postgraduate supervision

Supervision of final year undergraduates and postgraduates in testing and laboratory techniques for sample preparation

Research

RESEARCH THEMES

- High Temperature oxidation of alloys and metallic coatings.

RESEARCH ACTIVITY

- Oxidation of nickel-based superalloys, overlay and bond coats in thermal barrier coating systems.
- Development of a chromia forming thermal barrier coating system.
- Creep properties of metallic coatings

Other activities

- Member of a UK-based Thermal Barrier Coatings Discussion Group
- On the organising committee of the Conference entitled Microscopy of Oxidation

Publications

Jackson R.D., Taylor M.P., Evans H.E. and Li Xin-Hai, Oxidation Study of an EB-PVD MCrAlY Thermal Barrier Coating System, submitted for publication.

Taylor M.P., Evans H.E., Stekovic S. and Hardy M.C., The Oxidation Characteristics of the Ni-based Superalloy, RR1000, at Temperatures of 700-900°C, submitted for publication.

Taylor M.P., Evans H.E., Gray S. and J.R. Nicholls (2010) A chromia forming thermal barrier coating system, **Materials and Corrosion**, n/a. doi: 10.1002/maco.201005881.

Busso E.P., Evans H.E., Qian Z.Q. and Taylor M.P. (2010), Effects of breakaway oxidation on local stresses in thermal barrier coatings, **Acta Mater**, Vol. 58, Iss 4, pp1242-1251.

Busso E.P., Qian Z.Q., Taylor M.P. and Evans H.E. (2009), The influence of bondcoat and topcoat mechanical properties on stress development in thermal barrier coating systems. **Acta Mater**, Vol. 57, p. 2349.

Taylor M.P., Pragnell W.M. and Evans H.E. (2008), The influence of bond coat surface roughness on chemical failure and delamination in TBC systems, **Mater Corros**, Vol. 59, p. 508

Taylor M.P., Evans H.E., Busso EP and Qian ZQ (2006). **Creep properties of a Pt-aluminide coating.** (http://www.sciencedirect.com/science?ob=ArticleURL&udi=B6TWS-4K0FY2-2&user=122868&coverDate=07%2F31%2F2006&alid=1683789398&rdoc=1&fmt=high&orig=search&origin=search&zone=rsll_list_item&cdi=5556&st=13&docanchor=&view=c&ct=1&acct=C000010083&version=1&urVersion=0&userid=122868&md5=a07ff71346ce99910e7b7b3d8f41d734&searchtype=acta) **Acta Mater**; Vol. 54, Iss. 12, p3241; Vol. 54, Iss. 12, p3241 -3252.

Evans HE, Taylor MP. Delamination Processes in Thermal Barrier Coating Systems, (2003), **J Corros Sci Eng**, 6, H10.

Evans H.E. and Taylor M.P. (2001), Diffusion Cells and Chemical Failure of MCrAlY Bond Coats in Thermal Barrier Coating Systems. **Oxidation of Metals**, Vol. 55, Nos 1/2, pp17-34.

M.P.Taylor and H.E.Evans (2001), The Influence of Bond Coat Surface Roughness and Structure on the Oxidation of a Thermal Barrier Coating System. **Materials Science Forum**, Vols. 369-372, pp 711-718.

M.P.Taylor, H.E.Evans, C.B.Ponton and J.R. Nicholls (2000), A Method for Evaluating the Creep Properties of Overlay coatings. **Surface and Coatings Technology** Vol. 124, pp13-18.

Taylor M.P., Niranatumpom P., Evans H.E. and Ponton C.B. (2000), Observations of the Spallation Modes in an Overlay Coating and the Corresponding Thermal Barrier Coating System, **Materials at High Temperatures**, Vol. 17(2), pp219-224.

Evans H.E. and Taylor M.P. (1997), Creep relaxation and the spallation of oxide layers, **Surface Coatings and Technology** Vol. 94-5 (1-3): pp 27-33.