



### Yi-Bing Cheng

Professor of Materials Engineering  
Associate Dean (International), Faculty of Engineering

Diploma, Silicate Materials, Wuhan Univ. of Tech., China, 1978  
MEng., Silicate Materials, Wuhan Univ. of Tech., China, 1983  
PhD, Ceramics, Univ. of Newcastle-upon-Tyne, UK, 1988  
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## RESEARCH INTERESTS

Professor Cheng specialises in ceramic materials and composites. His research interests cover the areas of ceramic processing, microstructure development, phase characterisation, and materials applications in aggressive conditions. He has worked for a number of years in the development of non-oxide engineering ceramics and composites, especially sialons.

He is a chief investigator of the novel ceramic-polymer composites for fire-performance cable applications in the Cooperative Research Centre for Polymers. These materials possess polymer characteristics of high toughness and flexibility at room temperature, but when exposed to fire become hard and strong ceramics that have good dimensional stability, coherence and insulating properties. This technology has been commercialised by an Australian company and the research team has won several awards in 2004.

In recent years, he has been involved in the research of nano-TiO<sub>2</sub> based dye sensitised solar cells. His main interest is in the development of nanostructured working electrodes. Work has been carried out to modify the morphology and chemistry of the porous electrodes to improve the solar cells' performance.

As Associate Dean, International Professor Cheng is responsible for managing the faculty's international activities and developing international programs.

## TEACHING

Mechanical Properties of Materials  
Ceramic Technology  
Engineering Ceramics  
Glass and Glass-Ceramics

### SELECTED PUBLICATIONS

1. D.B.Menzies, L.Bourgeois, Y.B.Cheng, G.P.Simon, N.Brack, L.Spiccia, Characterization of nanostructured core-shell working electrodes for application in dye-sensitized solar cells, *Surface & Coatings Technology*, 198 (1-3)118-122, 2005
2. R.Cervini, Y.-B.Cheng, G.Simon, Solid-state Ru-dye solar cells using polypyrrole as a hole conductor. *Journal of Physics D: Applied Physics* **37**(1)13-20, 2004
3. Z.P. Xie, Y.-B. Cheng and Y. Huang, Formation of silicon nitride bonded silicon carbide by aqueous gelcasting, *Materials Science and Engineering A*, **349**, 20-28, 2003
4. Z.Q.Shen, G.P.Simon and Y.B.Cheng, Comparison of solution intercalation and melt intercalation of polymer-clay nanocomposites, *Polymer*, **43**(15)4251-4260, 2002
5. W.W.Chen, P.L.Wang, W.Y.Sun, Y.B.Cheng and D.S.Yan, Synthesis of (Ca, Mg)- $\alpha$ -sialon from slag by self-propagating high-temperature synthesis, *J. Materials Chemistry*, **12**, 1199-1202, 2002
6. Y. Zhang, Y.-B. Cheng, S. Lathabai, Influence of microstructure on the erosive wear behaviour of Ca  $\alpha$ -sialon materials, *J. of Euro. Ceram. Soc.*, **21**(13)2435-2445, 2001
7. K.Komeya, C.Zhang, M.Hotta, J.Tatami, T.Meguro, Y.-B.Cheng, Hollow beads composed of nanosize Ca  $\alpha$ -SiAlON grains, *J. Am. Ceram. Soc.*, **83**(4)995-997, 2000
8. T.Bakharev, J.G.Sanjayan and Y.-B.Cheng, Alkali activation of Australian slag cements, *Cem. and Concr. Res.*, **29**, 113-120, 1999
9. C.A.Wood, H.Zhao and Y.-B.Cheng, Microstructural development of Ca  $\alpha$ -SiAlON ceramics with elongated grains, *J. Am. Ceram. Soc.*, **82**, 421-28, 1999
10. H.Wang, Y.-B.Cheng, B.C.Muddle, L.Gao and T.S.Yen, Microstructure and mechanical properties of nano-scale SiC/calcium  $\alpha$ -SiAlON composites, *J. Mater. Sci.*, **32**(12)3263-3269, 1997
11. Nordmann and Y.-B.Cheng, Microstructure and properties of Li-Si-Al-O-N glass-ceramics, *Brit. Ceram. Trans.*, **96**(4)141-8, 1997
12. Y.-B.Cheng and J.Drennan, Microstructural characterisation of ZrO<sub>2</sub>/O'-SiAlON composites, *J. Am. Ceram. Soc.*, **79**[5] 1314-8, 1996
13. D.P.Edwards, B.C.Muddle, Y.-B.Cheng and R.H.L.Hannink, The development of microstructure in silicon nitride-bonded silicon carbide, *J. Euro. Ceram. Soc.*, **15**, 415-24, 1995
14. Y.-B.Cheng and D.P.Thompson, Role of anion vacancies in nitrogen-stabilized zirconia, *J. Am. Ceram. Soc.*, **76**(3)683-688, 1993
15. Y.-B.Cheng and D.P.Thompson, Nitrogen-containing tetragonal zirconia, *J. Am. Ceram. Soc.*, **74**(5)1135-1138, 1991