

Multifunctional Composite Interphases

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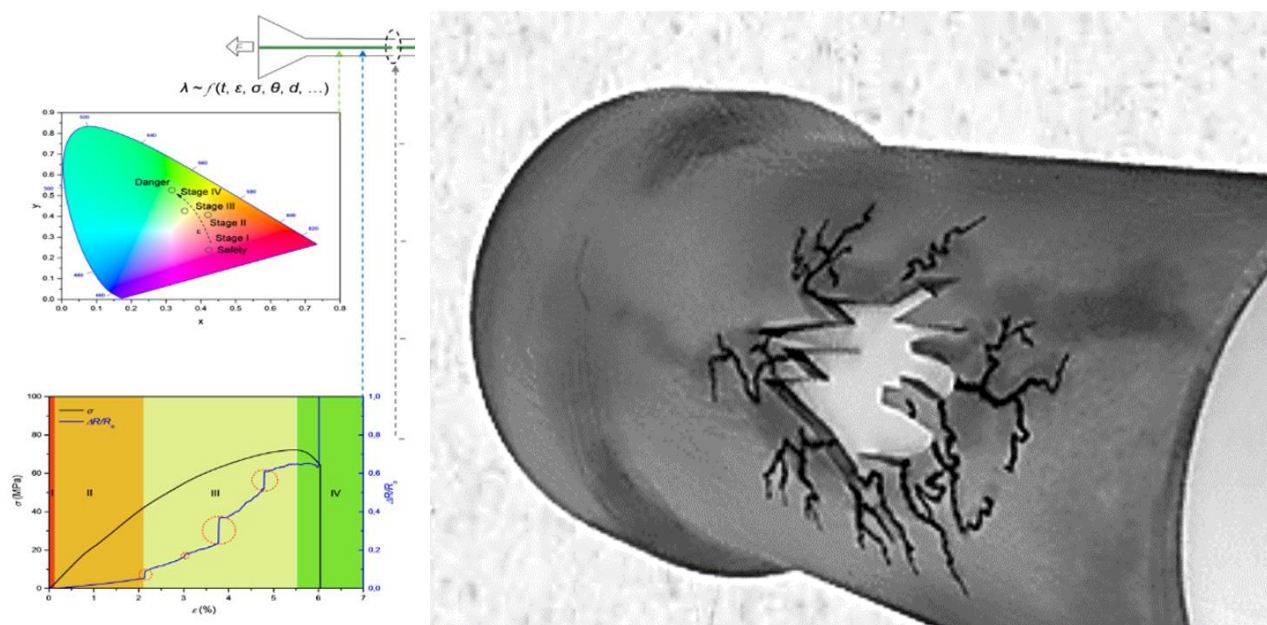
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Graphical Abstract



Abstract

This presentation will highlight some recent advances in multifunctional composite interphases. Our approach based on hierarchical structures of micro- and nanofillers in polymer matrix composites is proposed to develop stimulus-response ability. 2D nanofillers are used to integrate mechanical, optical and electrical functionalities into conventional fibre surfaces and polymer matrix composite interphases, which are transition regions where the chemical, mechanical and physical properties change from the bulk properties of reinforcement to the bulk properties of the polymer matrix. The nanofiller-rich interphases are able to detect and make utility of microcracks as real-time in-situ sensors for early warning catastrophic failure of materials. The stimulus-response composite interphases will enable various designs for many ‘smart’ applications for pipeline industry, which also will bring new opportunities to wide range of composite materials.

Keywords: Multifunctional composites, interphases, sensor, nanofillers.

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References

1. Y.H. Deng, S.L. Gao, J.W. Liu, U. Goh, E. Made, G. Heinrich, *Materials Horizons*, **2017**, *4*, 389.
2. Y.H. Deng, J.W. Liu, E. Made, G. Heinrich, S.L. Gao, *Advanced Materials Interfaces*, **2015**, *2*, 1500244.

Biography of Presenting Author



Shang-Lin Gao is a Chief Technical Officer, Fengye Holding Group, Zhejiang, China. He has been a senior scientist and principal investigator (PI) of Leibniz-Institut at Germany from 1999 to 2017 and mainly worked on highly competitive research grants awarded by German Research Association (DFG) and European Commission (EC). He received his PhD in Mechanical Engineering from the Hong Kong University of Science & Technology (HKUST) and his BS in Physics from Wuhan University.

His research has been focused on multifunctional composites. Current research centers on : (i) Multi-functional composites - Smart surface/interphase, Composite sensor; (ii) Multi-scale composites - Biology-inspired mechanical design, Nanostructured composite interfaces, Healing of nanoscale defects. He has contributed to over 100 scientific publications and presented over 60 lectures in international conferences. He also acts as reviewer for scientific journals and have co-chaired section in international conferences. He and his coworkers have also been honored with a few Awards.

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