Baohua Jia

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Biography

Baohua Jia is a full professor and a Research Leader at Swinburne University of Technology. She received her BSc and MSc degrees from Nankai University, China. She was awarded a PhD (2007) from Swinburne University of Technology, Australia. She is now the Honorary Treasurer of Australian Optical Society. Her research focuses on ultrafast laser imaging, spectroscopy and nanofabrication of novel photonic nanostructures and employment of nanostructures and nanomaterials for clean energy related research.

Dr. Jia has co-authored more than 200 scientific publications in highly ranked journals and prestigious international conferences including Nature Photonics and Advanced Materials. She has delivered more than 40 invited talks at prestigious international conferences and serves multiples professional committees. She has received numerous prizes and awards, with the most recent ones including the 2015 Significant Women in Australia, 2013 Young Tall Poppy Science Award, 2012 L'Oréal Australia and New Zealand for Women in Science Fellowship.

Presentation Title

Functional graphene metamaterials by femtosecond laser reduction

Achieving broadband total light absorption of unpolarized light within a subwavelength ultrathin film is critical for optoelectronic applications such as photovoltaics, photodetectors, thermal emitters and optical modulators. Here we experimentally demonstrate a low-cost and scalable multilayer graphene ultra-broadband total light absorber of record-high 90% of unpolarized light absorption at near infrared wavelengths with a bandwidth of more than 300 nm. The thin metamaterial consists of alternating monolayer graphene and dielectric material prepared by a low-cost wet chemical layer-by-layer method. A simple grating is fabricated using flexible femtosecond laser writing that simultaneously removes the graphene in the ablated regions and converts the remaining graphene oxide to graphene via photo-reduction. Our results open a novel, flexible and viable approach to practical applications of nanostructured photonic devices based on 2D materials, which require strong absorption.