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## Title: Damage Sensing Ability of Polymer Nanocomposites Filled With Long, Shortened and Damaged Carbon Nanotubes

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### *Abstract*

Carbon nanotubes (CNTs) were aggressively tip-ultrasonicated to produce shortened and damaged carbon nanotubes. High-resolution scanning electron microscopic analysis was performed to measure the dimensions of CNTs. Thermo-gravimetric analysis (TGA) was used to evaluate the damage in the sonicated CNTs. Shortened CNTs, in their pristine form (undamaged), were used for comparison with damaged CNTs. Nanocomposite bars, containing CNTs, were indented using Vickers hardness testing machine to produce sub-surface damage. Change in electrical conductivities were analysed after indentation to understand structural damage in nanocomposites having different types (i.e. damaged, shortened and pristine) of CNTs. Nanocomposites having longer and undamaged CNTs possess higher damage sensing ability as compared to nanocomposites having shortened and damaged CNTs.

### *Biography*

Dr. Inam joined Northumbria University in 2013 after developing composite materials at Airbus' Advanced Composite Training and Development Centre in North East Wales (UK) for Airbus A350 XWB. He led Composites and Aeronautical Engineering (Manufacture) programmes, which were delivered to aerospace and mechanical engineers from Airbus, Hawker Beechcraft, Thomas Cook, Royal Air Force and UNIMERCO. Prior to that, he developed armour and nanostructured materials for British defense purposes. Dr. Inam's most recent efforts have been devoted towards the development of advanced materials (ceramics, polymers, metals and composites) and nanomaterials (including fullerenes and graphene) for aerospace, petroleum, industrial, defence and bio sectors. His expertise includes materials physics, processing, characterization, performance evaluation, applications and materials sustainability. Dr. Inam has produced several high impact publications and his h-index is currently 16. He has authored/ co-authored more than 70 papers in peer-reviewed scientific journals and conference proceedings and has received more than 800 citations to date. He has carried out numerous industrial assignments and consultancies as well, e.g. Saudi Aramco, Technip Umbilicals Ltd etc. To date, he has contributed in achieving more than £850,000 research income from government and commercial platforms. He is a Chartered Scientist (CSci) and Chartered Engineer (CEng) and recipient of 2007 Materials World Award by Institute of Materials, Minerals and Mining (IoM3) as well.