

Carbon Black Recovered from used Vehicle Tyres used as Elastomer Reinforcement - Black Carbons that are Green

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The development of modern materials tends towards ever increasing performance and sophistication coupled with the design of new products and systems which are both energy efficient and have low environmental impact throughout their life cycle. The integration of advanced processing with recyclable and green precursors is a key requirement in the development of these new materials which will, therefore, have acceptable and sustainable environmental pedigree. In this talk we consider carbon black particles which are being recovered from used vehicle tyres and re-processed for use as reinforcement and fillers in elastomers and polymers. A key objective here is to control interface formation such that the desired bonding and stress transfer with a number of matrix compounds will allow these materials to be recycled back into the vehicle tyre and other industries.

The recovered carbon black materials (rCBs) have been characterized using SEM/TEM, and XPS and then surface functionalized using a scalable oxidative fluidized bed system. The materials have then been compounded into a series of elastomer matrix systems and the resulting mechanical properties of modulus and tear strength measured. In the paper the relationships between rCB structure, surface properties, interface formation and bonding and stress transfer will be discussed.