

Research Directions

Office of Research Services

Carbon Stronger Than Steel

Dr Nguyen Tran, Dr Adriyan Milev and Dr Kamali Kannangara from the School of Natural Science are using synchrotron radiation to make revolutionary materials out of carbon molecules in collaborative research with the Australian Synchrotron Research Program.



‘Carbon atoms have some wonderful molecular properties that not only form diamonds and graphite but can allow for the formation of tiny hollow tubes, called carbon nanotubes. These tubulous structures have outstanding properties that could potentially make them useful in many different applications, including in nanotechnology, materials science and electronics,’ says Dr Tran. ‘Since their discovery in the early 1990s, carbon nanotubes have been recognised as having exceptional mechanical strength, with single-walled nanotubes reported as having approximately 56 times more strength than steel wire. However, to successfully make useable materials from carbon nanotubes, a method needs to be found to combine them with other materials such as metals, plastics or ceramics. In the past, industrial production and use of materials made with carbon nanotubes has been limited by the tubes’ tendency to clump together. This project will explore how to achieve an even dispersal of carbon nanotubes into polymers to produce superior composite materials suitable for industrial applications.’

Using the state-of-the-art Australian Synchrotron Research Program x-ray absorption spectrophotometer, the research team will study the atomic and molecular structure and complex chemistry of interactions between carbon nanotubes and polymers. This will inform their understanding of how changing environmental conditions such as temperature and pH affects dispersal of the nanotubes throughout the various materials that the team will test.

This project will improve our understanding of what conditions reduce nanotube clumping, and may therefore lead to the production of innovative new materials that could revolutionise life with anything from better bionic ears or cancer treatments to smaller and more efficient satellites.

Project Title: Carbon Nanotube-Polymer Nanocomposite

Funding has been set at: \$6,055

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