

Continuing Bragg legacy of structure determination

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Over 100 years since the Nobel Prize-winning father and son team Sir William and Sir Lawrence Bragg pioneered the use of X-rays to determine crystal structure, University of Adelaide researchers have made significant new advances in the field.

Published in the journal *Nature Chemistry* today, Associate Professors Christian Doonan and Christopher Sumby and their team in the School of Chemistry and Physics, have developed a new material for examining structures using X-rays without first having to crystallise the substance.

"2014 is the International Year of Crystallography, recognising the importance of this 100-year-old science and how it underpins a vast range of the technological developments of our modern society," says Associate Professor Sumby.

"Today, [crystallography](#) is an area of science that's still providing new insights into the structures of materials – our new research is a prime example of that. It allows us to study chemical reactions that have just happened, or potentially even while they are still happening, which we can't do using normal crystallography."

The researchers are using a new nanomaterial – called a metal-organic framework – to bind the metal complex catalyst and its chemical reactants in place.

"We can then examine the structures of the reaction products using X-

rays without having to isolate the product or grow crystals," says Associate Professor Doonan.

"We are effectively taking snap-shots of the chemistry, enabling us to study the reaction products in their native state. In this way we can provide structural evidence for the chemical transformations that are taking place."

The research, being undertaken in the Centre for Advanced Nanomaterials, is supported by the Australian Research Council and the Science and Industry Endowment Fund.

Sir William Bragg started his work on X-rays and [crystal structure](#) when he was Elder Professor of Mathematics and Physics at the University of Adelaide. His son Lawrence was a graduate of the University. The new work is being carried out in the Bragg Crystallography Facility at the University's North Terrace campus.

More information: Capturing snapshots of post-synthetic metallation chemistry in metal–organic frameworks, *Nature Chemistry*, [DOI: 10.1038/nchem.2045](#)

Provided by University of Adelaide

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