

# Metals discovery goes against the grain

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Life in the laboratory is a stroll along the beach for two UQ researchers, after discovering metals bear exciting similarities to granular materials like sand.

Christopher Gourlay and Professor Arne Dahle from the CAST Cooperative Research Centre made the discovery when deforming metals as they were solidifying, publishing their findings in the journal *Nature*.

The authors explain that we are all familiar with wet sand drying up around our feet when we walk on the beach.

This happens because our weight forces the sand grains to rearrange, opening up spaces into which the surrounding water flows – a phenomenon known as “dilatancy” which was first described in 1885.

Mr Gourlay and Professor Dahle have proven for the first time that metallic alloys can also expand in the same way when cooled from the liquid state - the process used to manufacture everyday products such as steering wheels and mobile phone covers.

Mr Gourlay said the findings were an early but important step towards understanding how metals deform during industrial casting processes.

“The experiments take us another step towards understanding the deformation of solidifying alloys within the wider context of granular mechanics,” Mr Gourlay said.

The research behind the *Nature* paper, titled “Dilatant shear bands in solidifying metals” formed the backbone of Mr Gourlay's recently submitted PhD thesis.

Professor Dahle said the findings open up new and exciting links between alloy solidification and research areas as diverse as volcano and earthquake science, soil mechanics and the processing of cereal crops.

“It puts the research area on the map and provides new opportunities for further investigation and collaboration,” Professor Dahle said.

Source: University of Queensland

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