

Chemical Technology

Instrument measures freezing temperatures of thousands of water droplets

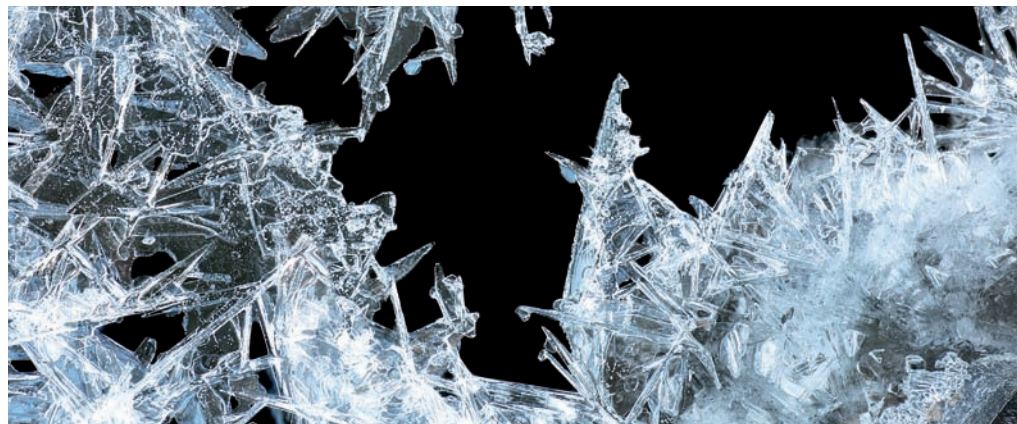
Supercool microfluidics

Our understanding of life and technology at extreme temperatures could become clearer thanks to a microfluidic device that studies ice formation.

George Whitesides, at Harvard University, Cambridge, US, and colleagues have developed a microfluidic device that produces supercooled water drops (droplets that remain liquid below 0°C) and measures the temperature at which ice nucleates in them. The device is two orders of magnitude faster than current state-of-the-art ice nucleation instruments and very accurate, claims the team.

Ice nucleation controls water's freezing process. Studying how water behaves is important for our comprehension of a wide range of processes, including precipitation formation, icing on roads and aircraft wings and life below 0°C, explains Whitesides.

'Methods of generating fundamental information about water in all of its forms – ice, water vapour and others – are both an opportunity for science



and a societal obligation,' he says. 'This study addresses one (of many) unresolved fundamental questions – how does the nucleation of freezing of water droplets occur? The instrument generates statistically large numbers of data under very carefully controlled and very well understood conditions.'

'This is an amazing piece of microfluidic technology designed for tackling longstanding problems,' enthuses Thomas Koop, an expert

Understanding ice nucleation is important in many fields, including snowmaking at ski resorts and reactive compound storage

in supercooled water and ice nucleation at Bielefeld University, Germany. 'I can envisage numerous applications in various fields of metastable liquids.'

Whitesides agrees that the device is suitable for studying other metastable liquids and expects that it will become an important tool. *Keith Farrington*

Reference

C A Stan *et al*, *Lab Chip*, 2009, DOI:10.1039/b906198c

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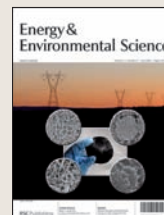
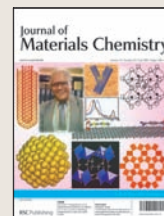
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