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Ice-like water supports hydration forces and eases sliding friction

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Confined unfrozen water plays a key role for water pipe repairs

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Nishad Dhopatkar and et al. mentioned the analyzed behavior of the confined water in their paper(1). In the latest water pipe repairs, double-ice-plug freezing using liquid nitrogen is used in Japan (2). Freezing water creates an ice plug to stop water flow. The new method uses double-ice-plug freezing instead of single-ice-plug freezing. Freezing the confined water surrounded by two ice plugs in water pipe creates the third ice-plug. The static adhesive strength of double-ice-plug freezing is roughly four times higher than that of single-ice-plug. The confined unfrozen water plays a key role for achieving the very high ice adhesive strength by taking advantage of water expansion upon freezing in the pipe.

References

(1) Nishad Dhopatkar and et al., ice-like water supports hydration forces and eases sliding friction, Science Advances, 26 Aug 2016, Vol.2, no.8, e1600763
(2) **https://patents.google.com/patent/JP2000028076A/en**

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