Review of: "Freezing of few nanometers water droplets"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

Authors reported experimental work on probing the freeing temperature T_N of water nanodroplets using metrologies, they found that The T_N drops sharply at size below 10 nm and reaches the limit of -43C for 2nm droplet; furthermore, the freezing rate drops with droplet size in the same manner. These findings are very important and can be attributed to the effect of molecular undercoordination and the derived supersolidity [1]. Molecular undercoordination shortens and stiffens the H-O bond but lengthens and weakens the O:H nonbond; The former dictates the melting temperature while the latter governs the T_N. The supersolidity has lower T_N, higher T_m, higher thermal diffusivity [2] that ensures its high energy conductivity and slower phase transformation rate.

[1] Sun, C.Q., Rules essential for water molecular undercoordination. Chinese Physics B, 2020. 8(8): p. 088203.
[2] Zhang, X., et al., Hydrogen-bond memory and water-skin supersolidity resolving the Mpemba paradox. Physical Chemistry Chemical Physics, 2014. 16(42): p. 22995-23002.