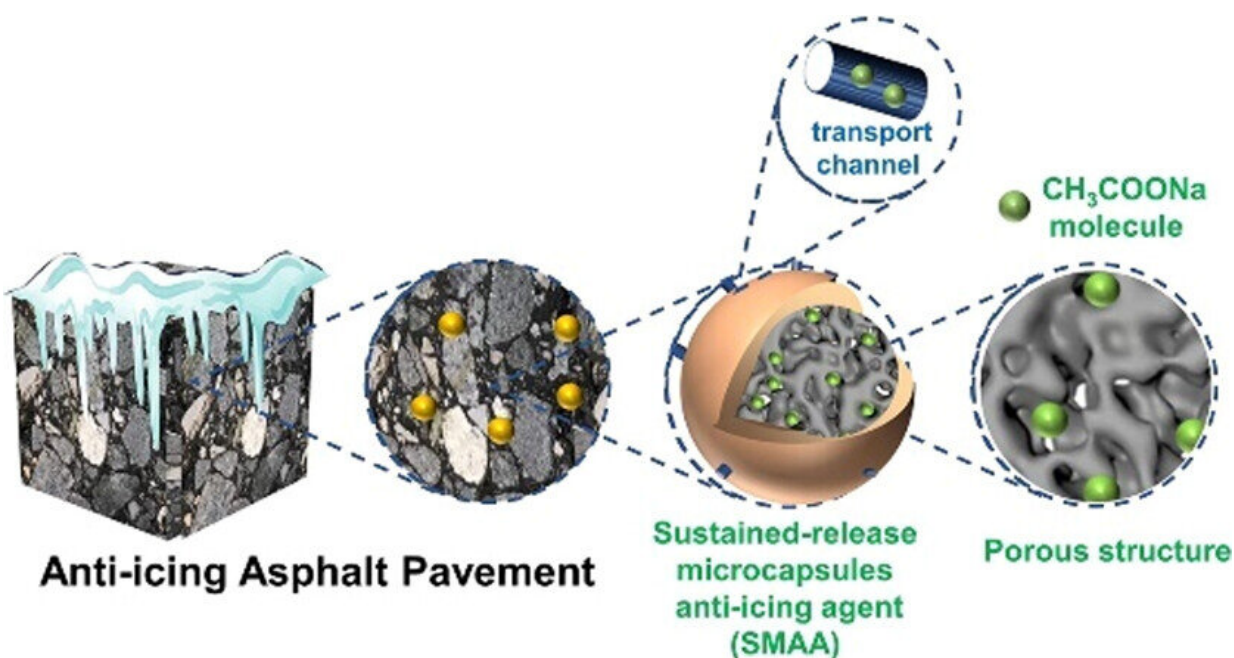


Keeping drivers safe with a road that can melt snow, ice on its own

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Graphical abstract. Credit: *ACS Omega* (2023). DOI: 10.1021/acsomega.2c07212

Slipping and sliding on snowy or icy roads is dangerous. Salt and sand help melt ice or provide traction, but excessive use is bad for the environment. And sometimes, a surprise storm can blow through before these materials can be applied. Now, researchers reporting in *ACS Omega* have filled microcapsules with a chloride-free salt mixture that's added into asphalt before roads are paved, providing long-term snow melting capabilities in a real-world test.

Driving on snowy roads at or near-freezing temperatures can create unsafe conditions, forming nearly invisible, slick black ice, if roads aren't cleaned quickly enough. But the most common ways to keep roads clear have significant downsides:

- Regular plowing requires costly equipment, is labor intensive and can damage pavement.
- Heavy [salt](#) or sand applications can harm the environment.
- Heated pavement technologies are prohibitively expensive to use on long roadways.

Recently, researchers have incorporated salt-storage systems into "anti-icing asphalt" to remove snow and prevent black ice from forming. However, these asphalt pavements use corrosive chloride-based salts and only release snow-melting substances for a few years. So, Yarong Peng, Quansheng Zhao, Xiaomeng Chu and colleagues wanted to develop a longer-term, chloride-free additive to effectively melt and remove snow cover on winter roads.

The researchers prepared a sodium acetate salt and combined it with a surfactant, [silicon dioxide](#), [sodium bicarbonate](#) and blast furnace slag—a [waste product](#) from power plant operations—to produce a fine powder. They then coated the particles in the powder with a [polymer solution](#), forming tiny microcapsules. Next, the team replaced some of the mineral filler in an asphalt mixture with the microcapsules.

In initial experiments, a pavement block made with the new additive lowered the freezing point of water to -6 F. And the researchers estimated that a 5-cm-thick layer of the anti-icing asphalt would be effective at melting snow for seven to eight years.

A real-world pilot test of the anti-icing asphalt on the off-ramp of a highway showed that it melted snow that fell on the [road](#), whereas

traditional pavement required additional removal operations. Because the additive used waste products and could release salt for most of a road's lifetime, the researchers say that is a practical and economic solution for wintertime snow and ice removal.

More information: Yingfei Zhao et al, Preparation of a Green Sustained-Release Microcapsule-Type Anti-Icing Agent for Asphalt Pavement and Its Application Demonstration Project, *ACS Omega* (2023). [DOI: 10.1021/acsomega.2c07212](https://doi.org/10.1021/acsomega.2c07212)

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