



## Radiative Cooling Structures and Systems

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#### Patent Status:

Utility Patent

### Description of Technology

Systems such as power generation and data centers create an excess amount of heat. Cooling these systems is not easy and generally requires energy or resources. Researchers are experimenting with ways to cool without using or resources. One way to accomplish this is with radiative cooling. In this method heat is deposited off of a surface and transported into the cold sink of space. This is relatively easy to do at night, but problems occur when direct sunlight is also absorbed. Some current materials allow for radiative cooling in sunlight, but are very costly. This would make it difficult to scale up to the residential and commercial applications that can benefit the most from radiative cooling.

Researchers at the University of Wyoming have created a method for cooling with radiative cooling that doesn't require any energy or water consumption, even under direct sunlight. They have created a transparent film that features randomly placed miniature glass particles which is then coated in silver. This material reflects incoming solar radiation but allows the structure underneath to still shed heat. It has a noon-time radiative cooling power of 93 W/m<sup>2</sup> under direct sunlight, which is theorized to be enough to cool a small family home in the summer if the roof was covered in this film. This film is also simple to make so it is easy to manufacture and can be upscaled to any need.

### Applications

This radiative cooling film has its main application in cooling structures. Power generation and data centers could use this film to help offset the cost of cooling, as well as residential homes in the summer.

### Features & Benefits

- Cools without requiring energy or water consumption
- Works under direct sunlight
- Inexpensive to manufacture



Gang Tan, a UW associate professor in the Department of Civil and Architectural Engineering, was part of a research team that developed a cost-effective and ecofriendly method of cooling without energy and water consumption. A transparent polymer film has been shown to cool whatever it sits on by as much as 10-15 degrees Celsius. (Gang Tan Photo)

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