

Opportunities for nanomaterials to facilitate research in extreme environments

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Abstract

In Antarctica, temperatures reach almost $-90\text{ }^{\circ}\text{C}$, winds rise to over 300 km/h, and the average elevation is 2500m. It holds the key to understanding the environmental history of our planet and our impact on it, and is an ideal location to study everything from biology and glaciology to geomagnetism and astronomy. However, such an inhospitable environment poses countless problems for the researchers who work there and the logistical teams that support them. In this presentation, I will recount my experience of a year spent at the Franco-Italian research station, Concordia, isolated on the Eastern Antarctic Plateau at an elevation of 3300m and a distance of 1200km from the coast, from the unique perspective of a materials scientist. I ask the question, how can nanomaterials facilitate research in a location such as this, considering such themes as energy generation and storage, smart clothing, and de-icing. In pushing technologies to their limit we can not only support current research at the Poles and high altitudes but also prepare ourselves for other hostile environments that we will find as we continue our exploration of Space.