ENERGY & MATERIALS FRONTIERS

Hadi Ghasemi

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Publications

1. Irajizad, P., Al-Bayati, A., Elsami, B., Shafquat, T., Nazari, M., Jafari, P., Kashyap, V., Masoudi, A., Araya, D., Ghasemi, H. Stress-localized Durable Icephobic Surfaces. Mater. Horiz., 2019, 6, 758-766.

2. Irajizad, P., Nazifi, S. and Ghasemi, H. "Icephobic Surfaces: Definition and Figures of Merit", Adv. Colloid Interface Sci., 2019, 269, 203-218.

3. Irajizad, P., Hasnain, M., Farokhnia, N., Sajadi, S. M. and Hadi Ghasemi, "Magnetic slippery extreme icephobic surfaces". Nat Commun., 2016, 7, 13395.

Patent Applications

1. US Patent Application No. 16/087,042; Magnetic Surfaces and Uses Thereof.

2. PCT Application (PCT/US2018/055793); Viscoelastic Anti-icing Surfaces.

Dr. Ghasemi conducts research in the fields of surface physics, heat transfer, and nanotechnology. He was recently awarded the Early Innovator Award by Cullen College of Engineering for his efforts at UH including mentoring students in innovation. He received the College Research Excellence Award in 2018. He also received the NASA iTech Top Three Innovator Award in 2017. One of the most significant contributions of his research is directed to the deicing technology. He has several publications and patent applications focusing on this technology.

DEICING TECHNOLOGY

Icing is an omnipresent phenomenon in nature and impacts a broad spectrum of industries, including but not limited to transportation systems, power transmission lines, infrastructure, and energy systems. Currently, non-wetting, liquid-infused and hydrated surfaces are routes implemented in developing icephobic surfaces. However, high ice adhesion strength and subsequent ice accretion, low long-term mechanical and environmental durability and high production cost have restricted the application of such surfaces.

Dr. Ghasemi's group has developed a new icephobic material system that has ice adhesion of an order of magnitude lower than that of the state-of-the-art materials while exhibiting long-term mechanical, chemical, and environmental durability. Specifically, Dr. Ghasemi has implemented the concept of volumetric stress-localization instead of surfacemodified methods to develop this system. With applications in transportation, energy, and biotechnology, Dr. Ghasemi's icephobic material system will bring about transformational advances in controlling, preventing and managing icing.

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