

Nuclear magnetic resonance for physical characterization of the liquid vein network in polycrystalline ice.

PI: Jennifer Brown, Montana State University
Awarded form 2013

The goal of the proposed research is to advance development of nuclear magnetic resonance as a technique in studies of icy environments with relevance to astrobiology. Ice a complex and dynamic low porosity porous media, where ice crystals compose the solid matrix and liquid veins the pore space. Nuclear magnetic resonance (NMR) relaxation time and molecular diffusion measurements, proven robust in probing pore structure in porous media, are sensitive to vein dimensions and therefore provide a novel method for monitoring ice structure and its evolution with time. With NMR, information on liquid water content, vein surface to volume ratios and tortuosity as a measure of vein network interconnectivity can be obtained. These measurements have the potential to provide unique insight into the physical characteristics of polycrystalline ice. The goal of the proposed research is to advance development of NMR as a technique in studies of icy environments with relevance to astrobiology in an effort to obtain future funding from NASA. If funded, the PI would extend temperature control from -13.5oC to -40oC and physically characterize ice with salt content and temperature conditions of relevance to floating ice shelves and the environment expected on Europa.

Contact Info

		E-mail:	jbrown@coe.montana.edu
Mail	Jennifer Brown	Phone:	(406) 994-7719
	Chemical and Biological Engineering		
	Montana State University	Fax:	(406) 994-5308
	Bozeman, MT 59717	Website:	None