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*Title:* Measurements of UCN storage times versus temperature in a deuterated-polystyrene coated acrylic cell

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**Measurements of UCN storage times versus temperature in a deuterated-polystyrene coated acrylic cell.** W. C. Griffith, Y. Bagdasarova, S. M. Clayton, M. D. Cooper, S. A. Currie, T. Ito, M. F. Makela, C. Morris, M. S. Rahaman, J. C. Ramsey, and A. Saunders, Los Alamos National Laboratory, Los Alamos, NM 87544, R. Rios, Idaho State University, Pocatello, ID 83209. It is planned that the Oakridge SNS neutron electric dipole moment (nEDM) search will utilize an acrylic neutron storage cell with a deuterated polystyrene (dPS) wall coating. The ultimate sensitivity of the nEDM measurement strongly depends on the storage cell having a long neutron storage time at cryogenic temperatures. We have built an apparatus to test the storage time of ultra-cold neutrons (UCN) in a dPS coated acrylic cell, at temperatures from 15–300 K. The cell is constructed from half inch thick acrylic plates that are bonded together with acrylic solvent cement, and the dPS coating is applied by “sloshing” a solution of dPS dissolved in d-toluene inside the cell. UCN generated at the LANSCE super-thermal deuterium source are used to test the storage time of the cell. After filling the cell with UCN, a valve specially designed to minimize UCN losses seals the cell for between 60 and 1200 seconds, and the remaining UCN are counted after opening the valve. We will discuss the apparatus and measurements made with it at 18, 40, 65, 100, and 295 K.

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