

Experimental Validation of a Numerical Model for Nitrogen-Activated Carbon Sorption Compressor Cells

N. Tzabar, A. Davidesko and A. Hamersztein, Thermal Energy Science & Tech. Laboratory, Ariel Univ., Ariel, Israel

Joule-Thomson (JT) cryocoolers operating with sorption compressors don't have moving parts, therefore, they have the potential for long life and vibration-free operation. In the frame of our ongoing research on sorption compressors, a one-dimensional dynamic heat and mass transfer numerical model is developed, aiming for optimizing the sorption cell design against different target functions. The current paper presents an experimental validation of the numerical model, including some adjustments in the model. The main modifications in the numerical model are; a three-to-one dimensions correcting factor, incorporating temperature dependent thermal properties and adjustments of the contact heat resistances. The results show a satisfying agreement between experimental and calculated results, over a range of operating conditions.