



Contribution ID: 417

Type: **Poster presentation (105min)**

Development of correlations for Thermophysical properties of supercritical Nitrogen to be used in HTS cables

Thursday, 10 July 2014 10:30 (2h 15m)

Improving the effectiveness of transmitting energy is a new challenge in future power applications. At present, there are 40-60% of losses in the transmission of electrical energy. In order to overcome such critical challenges a novel technology is needed to be developed.

As nitrogen is main constituent in air and therefore it can be used in various applications. In this proposed work, a conceptual application (cryogenics) of supercritical nitrogen (SCN) is introduced. Also, various thermophysical properties of SCN have been studied in the critical region. Further, the results of thermophysical properties such as density, viscosity, thermal conductivity and specific heat are analyzed with respect to varying temperature (TC + 50K) and increasing pressure. The analyzed results shows that, for 0.1K rise in temperature there is drastic change in density, specific heat, viscosity and thermal conductivity with increasing pressure. Moreover, correlations have been developed for the above thermophysical properties. The obtained correlations of SCN can be used for cryogenic applications in future HTS cables.

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Session Classification: Thu-Mo-Posters Session 3.3

Track Classification: C-06: Heat transfer and thermo-physical properties of solids and fluids