

Specific Heat Measurement of Mixed Refrigerants

S. Lee^{1, S, C}, D. Kim¹, S.H. Lee¹, W. Kang¹, S. Kwon¹ and Xiong Xiao²

¹*KRISS, Daejeon, Korea*

²*UWA, Perth, Australia*

lsjun@kriss.re.kr

Following the tightening of various environmental regulations around the world, there has been significant research activity focused on identifying alternative refrigerants that exhibit lower global warming potential (GWP). Deriving an accurate equation of state (EOS) through physical property measurements of newly developed refrigerants made by mixing known refrigerant materials in appropriate proportions is important for designing efficient cooling systems for industrial use. In order to accurately measure the specific heat of single refrigerants and newly developed mixed refrigerants, a sample preparation device was constructed in an existing commercial calvet calorimeter (Setaram BT2.15) system. The sample preparation device consisted of two syringe pumps (Teledyne ISCO, 260x) and a mixer (Vinci BTSP-500-5). The temperature of the system can be precisely controlled within the range of -40 to 60°C via a calorimeter, and the pressure can be monitored and actively adjusted in real time during the mixing process in the range of 1 bar to 100 bar. The system was checked by measuring and verifying the specific heat of widely used materials such as R32 and R125. We present results that show consistency with values found in existing literature, with a measurement uncertainty of less than 5%.