Experimental study on the thermal conductivity of graphene-carbon nanotube- silver nanoparticles ternary hybrid nanofluids

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Supporting information

The thermal conductivity (K) of the nanofluids was measured using a HTL-04 thermal conductivity of liquid (Eee, India) in range from 30° to 55°C. The apparatus for thermal conductivity of liquid is designed and develop according to the principal of guarded hot plate method as shown in Figure S1. Thermocouple T1, T2, T3 used for measuring cold plate temperature, T4, T5, T6 used for measuring hot plate temperature and T7, T8, T9, T10, T11 used to adjust the temperature of top guard and ring guard. Temperature of hot plate, ring guard and top guard are controlled by hot plate power (P1), ring guard power (P2) and top guard powder (P3). The K of fluid is calculated by using equation (1):

$$K = \frac{P1}{A} \times \frac{S}{Th - Tc} \quad (W.m^{-1}.K^{-1}) \tag{1}$$

where A is mean area for heat flow, S is thickness of liquid, Th and Tc are average hot plate and cold plate temperature, respectively.

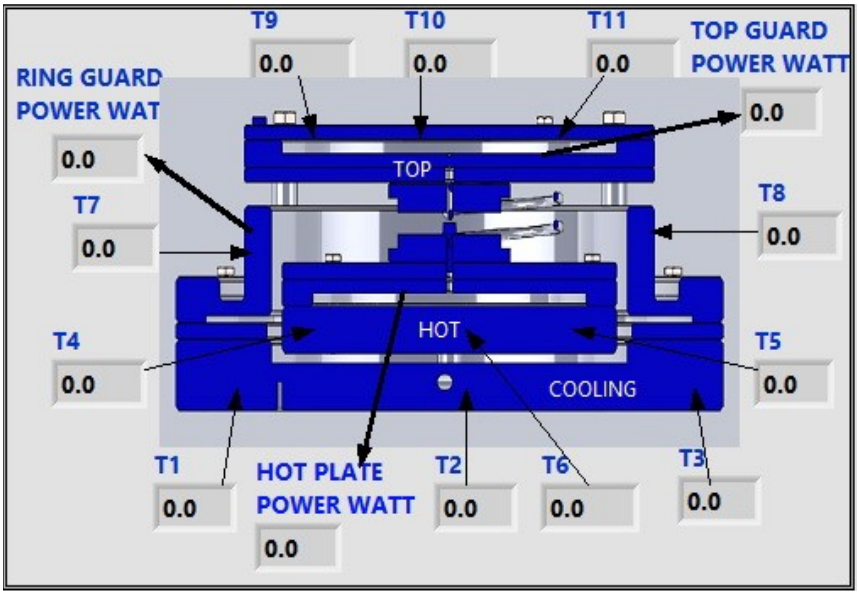

Fig. S1. Experimental procedure for measuring the thermal conductivity of nanofluids