Supplementary Information

Applications of Organic Nanofluid

This section of the manuscript discusses on the various industrial and commercial applications of organic nanofluids.

Table 1: Applications available in various literatures

Reference	Application	Organic Nanofluid	Key Results
Yu et al. [83]	Automotive Industry	ZnO nanoparticles dispersed in Ethylene Glycol/Water base fluid	1. High Boiling Point was found due to which the authors have suggested smaller engines as compared to the conventional large sized engines. 2. ZnO improved the thermophysical properties of the nanofluid more than 50/50 Glycol/Water based nanofluid.
Marquis and Chibante et al. [84]	Automotive Industry	Carbon Nanotube (CNT) based nanofluids	1. High thermal conductivity, improvement of engine's life, high chemical stability, less agglomeration and better cooling were reported. 2. The authors concluded that CNT based nanofluids will perform better than glycol or water based nanofluids.
Basha and Anand er al. [85]	Automotive Industry	Carbon Nanotube (CNT) based nanofluids	1. The carbon nanotubes were charged with diesel fuel and the engine characteristics were studied. 2. The Break Thermal Efficiency (BTE) increased by 7%, area to volume ratio was enhanced and

			better combustion were observed due to improved burning efficiency of the fuel.
Srinivas et al. [86]	Automotive Industry	Carboxylate additives with Carbon Nanotube (CNT) based nanofluids	Better corrosion resistance and thermophysical properties were observed in case of carboxylates as compared to Cu, Ag and Fe nanoparticles.
Chougule and Sahu et al. [87]	Automotive Industry	Carbon Nanotube (CNT) based nanofluids	1. Improvement of the coefficient of thermal convection was observed. 2. Better Cooling by the automotive radiators.
Ahmadi et al. [88]	Automotive Industry	Oil-based Carbon Nanotube (CNT) nanofluid	The thermal conductivity and flash point of the resulting lubricant improved by 13.2% and 6.7% respectively.
Huang et al. [89]	Organic Rankine Cycles	Graphene and Carbon Nanotube based nanofluids	1. Increment of the output power, thermal efficiency, and exergy efficiency to around 96.92 kW, 14.13% and 64.04%. 2. Increase in the net output power was found to be around 3.84 KW.
Refiei et al. [90]	Organic Rankine Cycles coupled with Solar Concentrators	MWCNT/oil nanofluid	Environmental impact was positive with lower emissions and the operation cost was also reduced to around 0.077 €/kWh. The thermal efficiency of the cycle was increased to around 18.9%.

Loni et al. [91]	Organic Rankine Cycles coupled with Solar Concentrators	Ethanol and Methanol additives with R11, R113, R114b and R601 based nanofluids	1. The turbine inlet temperature was studied with different nanofluids and at different volume fractions. It was found that the thermal efficiency increased for ethanol and methanol based nanofluids more than R11. 2. The turbine inlet temperature demonstrated a gradual increase in magnitude with a simultaneous increase in the thermal efficiency of the solar collectors.
Nelson et al. [92]	Coolant Loops in Electrical Power Stations	Graphite nanoparticles charged in Polyalphaolefin based nanofluids	The specific heat, thermal diffusivity, convective heat transfer and viscosity was found to increase by 50%, 4 times, 10% and 10 times respectively leading to enhanced cooling.
Li et al. [93]	Electronics Cooling	Carbon-acetone nanofluid	1. Micro-channel heat exchangers which are often used for cooling electronics have been investigated here. 2. The heat transfer rate was increased by 73%.
Kulkarni et al. [94]	Building heating and cooling	Ethylene Glycol/Water based nanofluid	1. It was found that the overall Coefficient of Performance of the HVAC system of a building increased with a reduction in the compressor work. Due to reduction in the compressor work,

			the energy cost was also reduced significantly. 2. The authors estimated a decrease in the size of the HVAC equipments upon using nanofluid.
He et al. [95]	Thermal Energy Storage	Carbon nanoparticle based nanofluid	1. Thermal conductivity of the Phase Change Material (PCM) was increased by 176.26%, 47.4% and 44.01% upon addition of graphene nanoplatelets (GNPs), multi-walled carbon nanotubes (MWCNTs) and nano-graphite (NG). 2. Phase change temperature range was shortened leading to higher latent heat capacities.
Rahman et al. 2019 [96]	Solar powered air conditioning system	SWCNT/R-407c	1. The thermal conductivity of the nanofluid increased by 15.6% compared to the base refrigerant – R-407c. As a result, the cooling load was reduced by 31.5%. 2. Additionally, as the compressor work reduced by 34%, the COP of the system therefore increased by 4.59%.