Research

Associate Professor Ts. Dr. Devarajan developed a Bio-Hybrid eco-friendly engine coolant

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PEKAN, 17 March 2022 – In order to create a more efficient engine, various researches have been done in relation to engine coolant.

After taking a look at the potential in the market, Associate Professor Ts. Dr. Devarajan Ramasamy, 44, a lecturer in Engineering College (KKEJ) of Universiti Malaysia Pahang (UMP), has successfully created an engine coolant, a liquid which can reduce the equipment's temperature quickly which is also eco-friendly.

The research which started in 2018 has gained full cooperation from the lecturer of the Faculty of Mechanical and Automotive Engineering Technology (FTKMA), Associate Professor Ir. Ts. Dr. Kumaran Kadirgama.

He said, this research is regarding an engine coolant that originated from plants and consist of a mixture of ethylene glycol with water and a mixture of graphene nanocellulose.

"Nanocellulose is first mix with water to create a nanocellulose solution which the weight percentage of nanocellulose in the nanocellulose solution is between 7.4% wt to 8% wt.

"Then, *ethylene glycol* is mixed with crystal nanocellulose solution (CNC) at a volume ratio chosen between groups consists of 20:80, 40:60, 60:40 and 80:20.

"A conventional heat-transferring liquid ethylene glycol and water shows a low thermal conductivity (EG+W: 0.2-0.8W/mK) which failed to fulfill the criteria to increase the efficiency of the thermal heat changer," he said.

He added that 35 percent of energy in internal combustion lost as heat.

"Internal increase of heat in engine is caused by insufficient heat transferred which will lead to engine damage"

"Thermal efficient coolant is increased by inserting a nano liquid with high heat conduction without any changes to the existing system"

"Engine is created to operate in a specific range of temperature for optimum efficiency, when the engine reaches a high temperature, it will use more fuel therefore, it will cause engine weary and produces more CO2., he said.

He explains, to withstand high temperature and decrease emission, conventional coolant needs to be replaced with nano liquid with increased heat load as well as being safer for the environment.

He hoped his research will be carried on and extended in the future to the automotive industry as well as becomes beneficial to the environment.

He states that the coefficient of thermal conductivity for graphene or CNC can be> 1000 W/mK higher than that of EG-W-based nanofluids.

“25 percent improvement in heat transferring can be attributed to *graphene* or CNC properties compared to those existing in the market.

The product which is selling at RM20 per bottle has gained the attention of the company Enhance Track Sdn Bhd that would like to be involve in the research.

During the International Invention, Innovation & Technology Exhibition (ITEX) 2021 which was held in Kuala Lumpur Convention Centre on 13th to 14th December 2021, this research was also given the grand prize, the gold medal.

Previously, he also created *graphene* based Bio lubricant oil or *Bio Hybrid Lubricant.*

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