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**Experimental study on density and thermal conductivity properties of Indian coal fly ash water-based nanofluid**

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**Abstract**

In the present study, the effect of temperature and volume concentration on thermal conductivity and density of water-based coal fly ash nanofluid for volume concentration range of 0–0.5% in temperatures ranging from 30°C to 60°C is investigated. The fly ash nanoparticles were characterised by scanning electron microscopy (SEM) and Zeta sizer to have an average particle diameter of 11.5 nm. The maximum thermal conductivity enhancement of 11.9% when compared to water at 60°C is observed with 0.5% volume concentration at the same temperature. The experimental data indicate an increase in the value of thermal conductivity and density with an increase in fly ash nanofluid concentration. Also, the thermal conductivity of nanofluid increases with temperature while density decrease with increase in temperature.

**Keywords:**

[Coal fly ash](https://www.tandfonline.com/keyword/Coal+Fly+Ash)[zeta sizer](https://www.tandfonline.com/keyword/Zeta+Sizer)[density](https://www.tandfonline.com/keyword/Density)[thermal conductivity](https://www.tandfonline.com/keyword/Thermal+Conductivity)

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