Particle Characterization: Module 12, Lecture 33

1. How is thermal conductivity (k) of a fluid related to its molecular mean velocity and mean free path?
2. How does k depend on temperature?
3. In a dilute suspension of supermicron particles, plot how k depends on volume fraction.
4. In a suspension of nano-particles, plot how k depends on volume fraction.
5. In a packed bed, how is k_{bed} related to k_{fluid}?
6. In a fluidized bed, how is k_{bed} related to k_{fluid}?
7. Explain spouting behaviour in a fluidized bed.
8. Why do soot particles glow?
9. Of nano-Cu, nano-CuO and carbon-nano-tube particles, which provides greatest enhancement of k, and why?
10. Outline possible mechanisms for heat transfer enhancement in nano-fluids.
11. How ould you design experiments to validate each of these?
12. Contrast parabolic & hyperbolic laws of heat conduction.
13. Explain wave theory of heat transfer in context of nano-particles.
14. How do external fields further enhance heat transfer in nano-fluids?