

## **ABSTRACT**

*This research will be to learn about one of the applications of nanotechnology, one of which is the application of making nanoparticle material. Nanoparticles have advantages could bring properties such as carrier particles, the number and have improved properties when compared with nano-particles with a size above. Alumina ( $\text{Al}_2\text{O}_3$ ) is used as the base material of aluminum, has thermal properties that could make these materials as a conductor of heat and a heat sink. If used in nano size, is expected to be mixed with other materials, for use in everyday life. Suppose that can be applied in engine cooling system, in which the alumina nanoparticles to be mixed with the lubricant that will be called nanofluids, to improve the performance of the cooling engine.*

*Characteristics thermal properties of  $\text{Al}_2\text{O}_3$  nanoparticles will be learned.  $\text{Al}_2\text{O}_3$  nanoparticles derived from the Sol-Gel process which will be carried out on the research. The final result of compounds  $\text{Al}_2\text{O}_3$  to selanjutnya made into nano size. XRD test and SAM (Surface Area Meter) is performed to determine whether the compound has nano-sized  $\text{Al}_2\text{O}_3$  and know the content of what is contained in the  $\text{Al}_2\text{O}_3$  compound. Further characterization of thermal properties of nanoparticles  $\text{Al}_2\text{O}_3$  to be implemented on a heat transfer system.*

*Keywords :nanotechnology, nanoparticles, nanofluids, Alumina, Sol-Gel Method, Thermal Conductivity*