# ABSTRACT

Dielectrophoresis (DEP) is a technique for controlling dielectric particles using a non-uniform electric field. The movement of the DEP particles is affected by the difference polarization between the particle and the device medium. The DEP technique is a technique using two electrodes that are energized, making a particle trap using electromagnetism. The limitation of conventional DEP is that it has two physical electrodes with a cable attached which hinders its use for nano materials. In the end, a separation technique or particle movement using a Tesla coil which is called Teslaphoresis by utilizing wireless energy to move particles.

In this study, the authors designed a Teslaphoresis implementation system with a Tesla coil type solidstate tesla coil (SSTC) integrated with an Arduino microcontroller and a transistor as a primary coil driver that induces current to the secondary coil and produces spark. The spark on the Tesla coil is used to applied to conventional DEP techniques. The particles used is ZnO and Fe2O3 with water media which are placed in a metal container that filled with water. Tesla coil which is designed with five different input frequencies, that is 500 kHz, 1 MHz, 3 MHz, and 8 MHz is used for the comparison of the manipulation of the movement of ZnO and Fe2O3 particles.

As the results achieved in this study to simplify conventional particle separation techniques. The movement of ZnO and Fe2O3 particles forms the p-DEP process. At a frequency of 1 MHz with ZnO particles resulting in a collected particle diameter of 1.5 mm. At a frequency of 8 MHz with Fe2O3 particles resulting in a collected particle diameter of 6 mm. It is hoped that the teslaphoresis technique can simplify the conventional DEP technique.



**Keywords** : Dielectrophoresis, teslacoil, Arduino, Teslaphoresis