**ABSTRACT**

The widespread use of portable electronics has made energy generation and storage an important issue for scientists and engineers. The possibility to harness energy from ambient sources of energy, such as vibration, friction, and sound, has been realized as triboelectric generators. However, the comparison of the combinations of materials in these generators have not been addressed in detail. New knowledge gained from research can eliminate the lack of clearly established relationships that relates different materials used in triboelectric generators. Studying the output parameters of triboelectric generators with different material components will provide new insight on effective material selection for further research and applications. The main focus of this research is to investigate how the material composition affects the triboelectric generator’s process of producing electric power. All other factors, such as temperature, device construction, device layout, and measurement procedure will be held constant. Given differing material combinations, sets of triboelectric generators will be fabricated. Due to the wide expanse of possible combinations of materials, a short list (two to four) of known well performing materials will be selected for other materials to compare to. Each of these will be excited with a controlled source of mechanical energy, and measurements on the electrical output generated will be recorded. Once data has been collected, the combinations will be ranked based on performance in different parameters. In addition, any trends between electrical performance and material/chemical properties will be investigated. Advances in this field can provide solutions to telecommunications and low power electronics companies looking for promising technology for charging and powering the widespread use of their portable devices.