Reduce, Reuse, Recycle: Optimizing the Reclamation of Polyethylene Plastics for Utilization as Fluorescent Thread Fibers

Jones, Levi
Smith, Mickayla

The problem focuses on the optimization of making fibers from recycled polyethylene terephthalate in terms of an increase in sustainability in the process, efficiency of the product, and improvement of the thread product. By implementing a second heating into the thread production process, the produced fibers will be stronger with a higher tensile strength. The purpose of the research was to improve the recycled polyethylene terephthalate glow in the dark fiber-making process to create more efficient and higher tensile strength glowing fibers than what were known to be made in prior experimentation. The recycled thread production procedure involved melting cleaned recycled plastic bottles and adding the glowing strontium aluminate powder to the melted plastic. From the melted plastic, strands of plastic were pulled to create the fibers. The new fiber strands were then cooled and coiled around a spool. The reheating step was then done to the fibers and they were again cooled and spooled. The tensile strength of the recycled fibers made with and without reheating were compared then by measuring and recording the force required to break the fibers. The tensile strength results supported the hypothesis that the thread strength was improved by adding a reheating step, thereby solving the problem of improving the strength of the recycled fiber product.