The Effect of Titanium Dioxide on the Photodegradation of Plastic

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The purpose of this experiment was to determine if mass loss would occur in household plastic products due to photodegradation aided by non-modified titanium dioxide in the presence of ultraviolet (UV) light. In doing so, this study's results could replace recycling as a solution to reducing plastic waste. To test this, 30 approximately 2.5 centimeters by 2.5 centimeters square samples were created from polypropylene (PP) and low density polyethylene materials (LDPE), which were then UV irradiated for a total of 240 hours and weighed every 24 hours. The results display an average mass difference of 0.027 grams for the PP group, while LDPE experienced a loss of 0.021 grams. An analysis via two paired t-tests shows that this data was statistically significant in terms of an alpha value of 0.05. As such, the null hypothesis of no mass loss occurring could be rejected in favor of the alternate hypothesis, which states that there would be a change in mass.

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