Self-healing Polymers: What Factors Affect the Speed at Which Polymers Self-heal?

Gardner, Blake

The purpose of my experiment was to understand self-healing polymers and their interaction with catalysts. I studied the speed of rebonding with and without external catalysts on self-healing polymers. My research can be later used for life-saving operations such as artificial organs in humans, thus possibly extending life expectancy. After cutting each self-healing mat into 90 1 cm x 4 cm lengths, I made a 0.5 mm incision on 8 different self-healing mats at a length of 1 cm. I timed the speed it took to rebond. The catalysts I used were heat to 100°F, cooled to -17°F, depth to 1.0 mm, length at 2 cm and 3 cm, The Original Super Glue and New-Skin Liquid Bandage. When depth was a catalyst, the rebonding rate was higher than my control rate and my hypothesis was supported. The same was true when length was a catalyst, the rebonding rate was longer and my hypothesis was supported. When heat was a catalyst, the polymers rebonded a few seconds longer than room temperature. My hypothesis was supported for the cold catalyst. My hypothesis for the rebonding rate of Original Super Glue was opposite of the results of my experiment. My hypothesis for New-Skin Liquid Bandage was not supported due to the fact that the polymer was not porous and reacted similarly to the super glue. In conclusion, my test results for my hypotheses for cold, length and depth were supported. My hypotheses for heat, super glue and bandage were not supported.

Awards Won: