TITLE: Comparison of the Optical Properties and Performance of Different Glazing Materials for Solar Thermal Systems.

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This project involved the comparison of the optical properties and performance of different glazing materials for solar thermal systems. Initially three different solar thermal systems were examined to determine the most appropriate one to use for this project. The systems were solar water heaters, solar stills and solar crop dryers. The system that was selected was the solar still since it was the easiest to construct and most economical. The glazing materials used were tempered glass, ordinary window glass and fiberglass reinforced plastic (Filon).

Three similar solar stills were constructed and the glazing materials of dimensions 18x12 inches were mounted on them. Thermocouples were attached to the base of the still and on the surface of the glass. The stills were placed on the roof of the Natural Sciences building. Equal volumes of water were poured into each still and the systems were allowed to operate under different insolation conditions. Measuring and comparing the volume of distilled water produced by each still determined the performance of each system. The optical properties of the glazing materials investigated were the transmittance, reflectance and absorption, which are all functions of the incoming radiation, thickness, refractive index and extinction coefficient of the material. These properties, which affect the performance of the materials, were calculated and the values for the different materials were compared. This project serves to determine the most suitable material for applications as solar glazing for small-scale, low-medium temperature, thermal systems.