

Challenges of Coating Plastics

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Plastic optical components have gained popularity (especially in consumer markets) due to lower manufacturing costs, lighter weight and the ability to mold complex assemblies into a single finished part. Their optical surfaces are often coated to enhance both mechanical durability and optical performance. We will discuss a few of the difficulties encountered when depositing dielectric thin films on these materials.

Plastics are organic and thin films are typically inorganic oxides, making bonding difficult. An interface is often created between the substrate and film to provide better adhesion. This can be accomplished by applying a thin “hard coat” before the parts are loaded into the chamber, or by altering the surface chemistry of the part in the vacuum chamber immediately before deposition of the film.

Many plastics absorb water from the atmosphere, making adhesion more of a challenge. This can be mitigated by “baking” and careful control of the environments the parts are exposed to prior to coating.

Some plastics are very temperature sensitive and care must be taken to keep the substrate below the glass transition temperature during the entire coating process. All sources of heat in the chamber must be considered as well as shielding and fixture-ing.

There are many types of plastics being used for optical components today, and more are continuing to be developed. Each polymer requires unique combinations of deposition conditions and materials to provide optimum performance. VisiMax Technologies has the experience and processes in place to handle the most demanding coating challenges.

About VisiMax

Founded in 2000 with headquarters in Twinsburg, Ohio, VisiMax provides quality thin-film coatings that make VisiMax a leading optical coatings manufacturer in the industry. With over 50 years of combined experience in thin-film coatings for glass or plastic, VisiMax delivers technical expertise, an innovative approach, cutting-edge facilities and, most important of all, consistently high customer satisfaction rates. For more information, please contact Richard Hunter at (800) 394-0799 or info@visimaxtechnologies.com.