# 5. CASE STUDIES OF SEMI-COMMERCIALIZED OBCS INNOVATIONS

## 5.1 DIELECTRIC COATING FOR LIGHTING FIXTURES

### 5.1.1 The Innovation

Dielectric coatings (which are also called optical interference coatings) are relatively new to the lighting industry, although they have been used for years in cameras, projectors, and other optical instruments. Optical coatings can reduce reflection from camera lens surfaces, increase reflectance of mirrors, and perform other light control functions. The application of dielectric coatings can significantly enhance the reflectivity of anodized aluminum lighting sheeting in lighting fixtures. Optical interference coatings are made by depositing vaporized materials onto the substrate in a vacuum chamber. The materials used for the coatings include metals such as silver and aluminum, semi-conductors such as silicon and germanium, and inorganic dielectrics (nonconductors of direct electric currents) such as magnesium fluoride and titanium dioxide. These coatings have been referred to as thin films because the thickness of a single layer is about 0.1 micron. The coatings of interest to the lighting industry are multilayered with a total thickness of slightly less than 1.0 micron (Rubins, 1981).

### 5.1.2 The DOE Role

Dielectric coatings were produced in the late 1970's by the Optical Coating Laboratory, Inc., (OCLI) for a variety of applications that did not include lighting fixtures. In 1979 OCLI began an effort to develop optical interference coatings that would increase the reflectivity of prefinished aluminum lighting sheet. At the same time, Lawrence Berkeley Laboratory was assisting the U.S. Department of Energy in planning and encouraging the development