
Recent development of materials for IR applications

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Abstract

Infrared windows and optics are widely used in low temperature imaging, night vision, ranging and surveying, remote sensing applications and free space optical communication. Important bands for imaging are the spectral regions that cover the wave-length range from 0.4 to 12 μm . Unlike the visible applications, the range of materials for infrared applications is much more limited and their cost increases rapidly with increased performance. The windows and domes of middle-IR (MIR) far-IR (FIR) sensors on missiles and aircraft often become the key point of failure for systems because of their interaction with the harsh environment. These windows must provide maximum transmission of signal with negligible absorption, withstanding the thermal shock, electromagnetic interference (EMI), radar latent, and abrasion from raindrops and sand particles. The window must also be isotropic, easily moldable in large and complex shapes and available at low cost. Large numbers of programs (e.g. used in aircraft and HEL systems) require flat (or dome) windows with sizes larger than 500 mm diameter, which puts additional limitations on the available materials. It's still a great challenge to fabricate the IR- transparent materials with high-properties and large size. In this talk, the recent progress to face the above challenge was demonstrated and reviewed, especially which were done in our group. The prospect of the infrared materials toward cutting-edge applications was also discussed in this talk.

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