Innovative coating solutions as an economical alternative to gold: Comparison of coatings for IR optics

We implement targeted alternatives for IR optical coatings, including in the defense sector, ranging from Cu- and Al-enhanced layers to hybrid metal/dielectric , combinations. In addition to spectral performance, we also consider all relevant operating conditions.
We offer a wide range of services, from initial concept development to production and delivery.

Type of coating / Coating type	Spectral range (typ.)	Reflectivity / Performance	Environmental stability	Mechanical robustness	Cost	Typical applications
Gold (Au)	MWIR / LWIR	Very high in IR	Very good	Medium	High	Reference solution, high-end IR
Cu coating	MWIR / LWIR	High, slightly below Au	Medium	Medium	Low–medium	Cost-optimized IR systems
Cu + protective layer	MWIR / LWIR	High	Good	Good	Medium	Industrial & defense IR
Al pure)	VIS – NIR	Good in VIS/NIR, weaker in IR	Good	Good	Low	Multispectral optics
Al enhanced	VIS – MWIR	Optimized in IR	Very good	Very good	Medium	Multispectral, robust IR
Metal/dielectric stack	Depending on application	Customized	Very good	Very good	Medium-low	Demanding IR & defense
Dielectric coating	Engbandig	Very high (depending on design)	Very good	Very good	Medium	Filters, selective IR optics

Notes:

- Al-enhanced = aluminum with optimized dielectric coatings to improve IR performance.
- Metal/dielectric combinations allow targeted adjustment of reflectivity, emissivity, and protection.
- Environmental stability takes into account humidity, temperature changes, and mechanical stress.