Greater Specular Reflectance for ORC Collector and Optical Materials (CSP-3)

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Scientific Achievement:

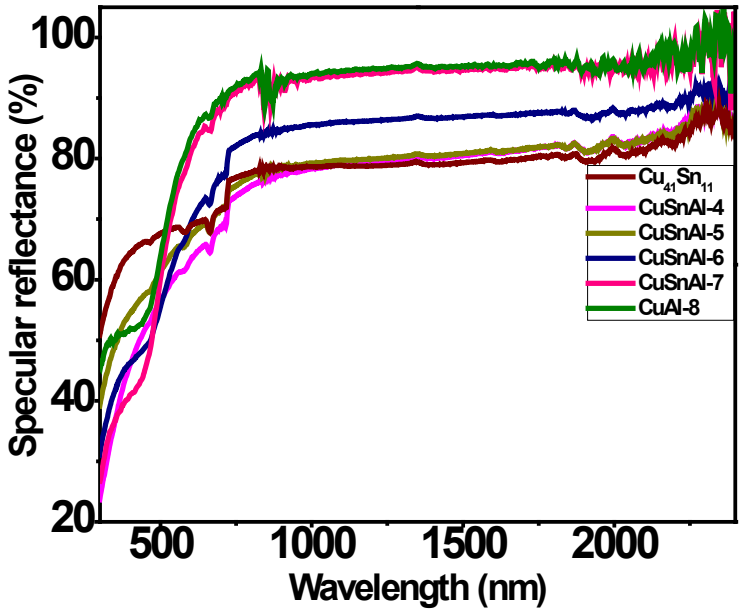
Demonstrated the new alloy design approach involving substitution of Sn by Al in Cu-Sn-based single-phase $Cu_{41}Sn_{11}$ alloy to enhance the specular reflectance property. In particular, bulk Cu-Sn-Al intermetallic alloy-based solar reflectors with 80%–83 % specular reflectance were developed (see figure).

Significance and Impact:

Newly developed Cu-Al alloys exhibit even superior specular and solar reflectance property than many of the earlier investigated multilayer reflective coatings or other commercial reflectors.

Research Details:

- Conventional metallurgical processing approach of arc melting followed by suction casting can develop the presently investigated solar reflectors with nanoscale roughness, together with good hardness property and uniform microstructure.
- Newly developed Cu-Al alloys exhibit even superior specular and solar reflectance property than many of the earlier investigated multilayer reflective coatings or other commercial reflectors.



Specular reflectance of 80%–83% for bulk Cu-Al alloys.

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