

## Optimization of Cu blackening through CuO oxidation for the application of camera spacer

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At present, black polymer spacers are used for separating aligned camera lens physically in a camera module in a mobile phone. However, mechanical properties of polymer spacers have their limits especially in a current trend that more lens are used in a thinner camera module. Thus, a black oxide such as copper (II) oxide (cupric oxide, CuO) becomes a good candidate to those polymer spacers because of its superior mechanical properties and its inherent blackness. The latter is very critical in quality control because the closer the color of the spacer is to black, the less the interference of light and the flare phenomenon occur. The general Cu blackening process is composed of cleaning, deoxidization, activation, blackening and sealing. In our study, we were to optimize the whole blackening process as well as each unit process according to the operational parameters such as process temperature, the activator concentration, etc. The blackness of blackened Cu strips was measured by a colorimeter as an indicator value for the process optimization.