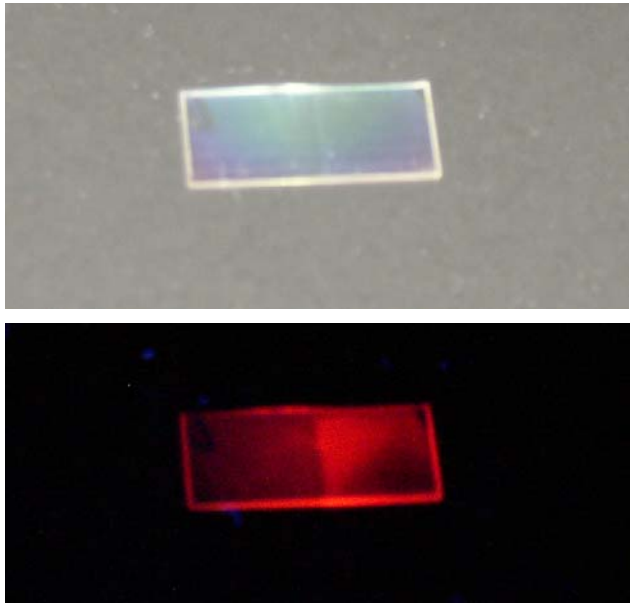
Bright, saturated red luminescence in PLD-deposited BaCuSF films



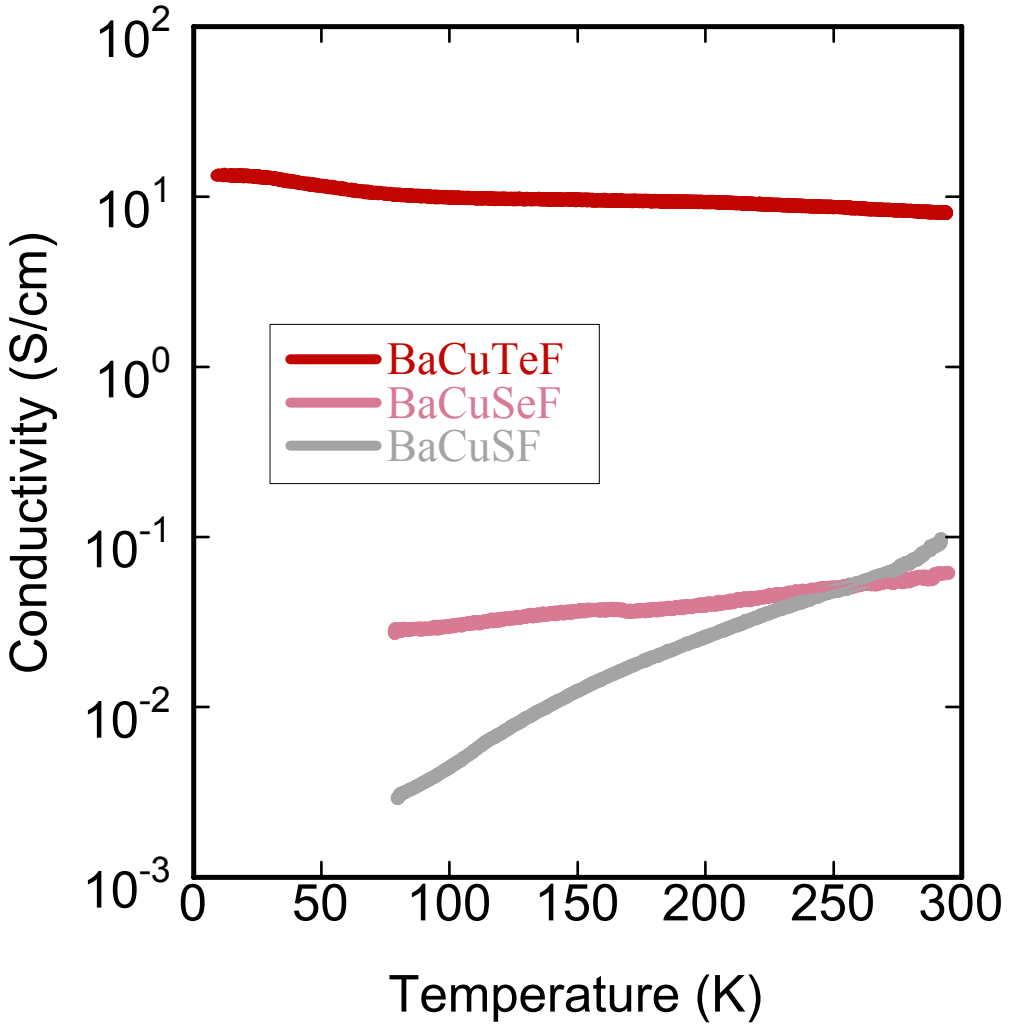
BaCuSF film under white light (above) and ultraviolet (below) illumination.

BaCuSF is a transparent p-type semiconductor that exhibits photoluminescence in a wide variety of colors depending on preparation conditions and ambient temperature.

Here, bright saturated red luminescence is observed in BaCuSF films deposited by pulsed laser deposition (PLD) and post-annealed at 650˚C. Novel light emitting devices are possible applications for this material.

BaCuTeF: a new p-type degenerate semiconductor

Temperature dependent conductivity of BaCuQF pressed pellets



BaCuQF (Q = S, Se, Te) are p-type semiconductors that show promise for transparent electronics applications. Conductivity can be enhanced by doping, but even nominally undoped materials are conductive (see graph). The newest member of the family, BaCuTeF, has a conductivity that increases as temperature decreases, in contrast to the Se and S analogs.

The bandgap can be continuously tuned from 3.1 eV to 2.3 eV in solid solutions of BaCu(QQ')F, making them of considerable interest for tandem solar-cell applications.

Transparent conductors

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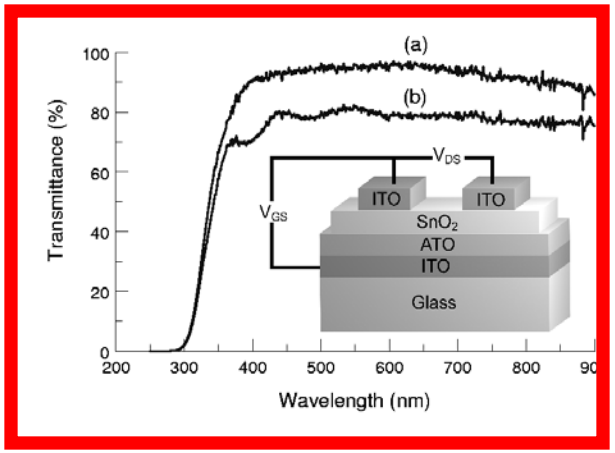
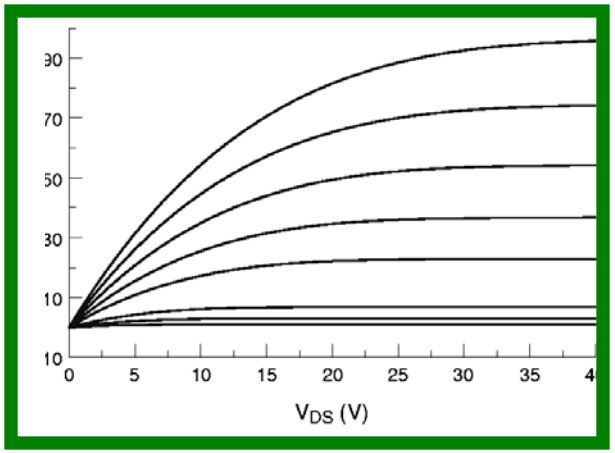
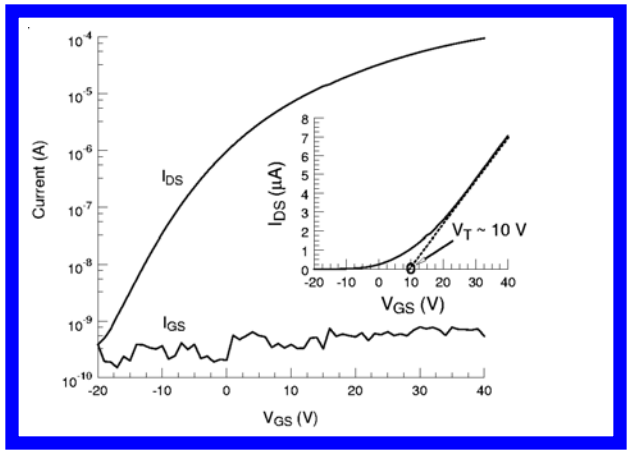
SnO_2 Transparent Thin-Film Transistors (TTFTs)







- **Highly transparent**
- **Enhancement-mode & excellent saturation**
- **~10^5 drain current on-to-off ratio**
- **Novel gas sensor applications**