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## Tuned nanocrystals warm up LED lighting

A [new study](#) by Turkish researchers shows that coating LEDs with tuned nanocrystals makes their light warmer. Removing the bluish tinge of current LED light is essential if this energy efficient light source is to illuminate homes and offices.

Most people find the ‘lunar white’ light of current commercial LEDs unattractive as it is much harder on the eye than the relatively warm light emitted by incandescent bulbs. The cool white light of LEDs also distorts the colours of objects lit by it.

[Hilmi Volkan Demir](#) and his colleagues at Bilkent University in Ankara have developed LEDs with a colour rendering index (CRI) of more than 80. This is significantly higher than can be achieved with commercial indium gallium nitride LEDs coated with yellowish yttrium aluminium garnet phosphors. Incandescent bulbs define the CRI benchmark of 100.

To accomplish this feat, the researchers coated blue LEDs with a layer of nanocrystals made from a core of cadmium selenide with a shell of zinc sulphide. The crystals absorb part of the blue light emitted by the LEDs, and emit their own red and green light. The combination of colours results in a soft white glow.

By using a combination of nanocrystals it should be possible to generate any desired emission spectrum. ‘In principle, increasing the variety of nanocrystals with different sizes will help with increasing the photometric quality of the generated white light,’ says Demir. ‘However, this comes at a cost of increased complexity.’

Demir reports that his group has used three different sizes of nanocrystals, and found that this provides very good photometric properties, including a correlated colour temperature of less than 4,000 K, a high CRI, and a luminous efficacy of over 300 lumens per watt.

Core-shell nanoparticles are difficult to produce, but Demir adds that other research groups are actively working on synthesising the nanocrystals in large quantities.

*Francis Sedgemore, 11/2-08*

## References

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