CONSERVE
Energy through Greater Efficiency

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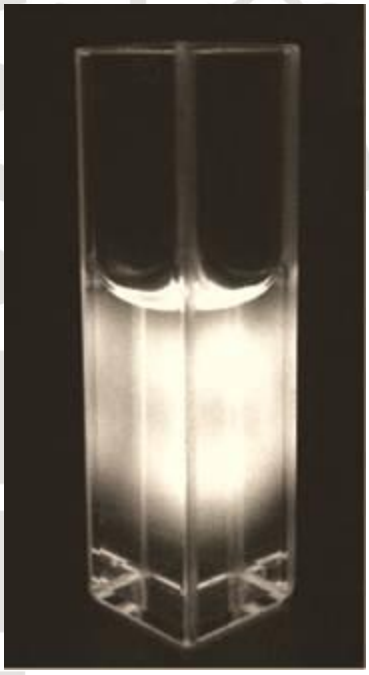
RENEWABLES | SMART GRID | STORAGE | SUSTAINABLE MOBILITY | **SUSTAINABILITY ANALYSES**



LET THERE BE NANO-ENGINEERED LIGHT

Pavle V. Radovanovic, Ting Wang, Vadim Chirmanov, Wan Hang M. Chiu

Few of us think twice before we flip on a light switch. Yet lighting eats up 20 per cent of the world's electricity production and accounts for more than 1,900 megatonnes of carbon dioxide emissions each year.

Energy-efficient lighting like fluorescent bulbs and LEDs have made a big difference, but they're complex to design and expensive to manufacture. That's why Pavle Radovanovic, Canada Research Chair in Spectroscopy of Nanoscale Materials, turned to nanotechnology for alternatives.

The Waterloo chemistry professor and his team started with gallium oxide nanocrystals. Because gallium oxide is photoluminescent, it gives off light when it absorbs photons. However, it produces blue-green light rather than the white light that consumers and businesses want. To address that problem, the researchers added organic dye molecules to the mix.

By selecting dyes that emit red-orange light and by controlling the size of the gallium oxide nanocrystals, which controls the precise colour of light the crystals emit, the team was able to create pure white light.

The result is a new class of hybrid light-emitting nanostructures with a whole range of potential applications — including energy-efficient light bulbs that might give fluorescent lighting and LEDs a run for their money.

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