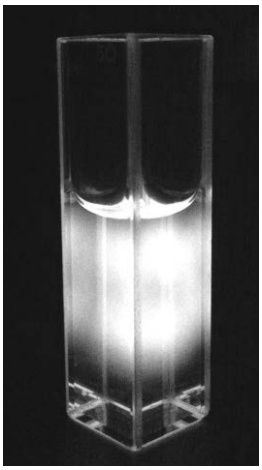
UNIVERSITY OF WATERLOO

TECHNOLOGY SUMMARY

Pure White Light Emitting Nanomaterial "NanoLite"



Background

Consumers and industry are seeking safe, durable, energy efficient alternatives to traditional incandescent light bulbs as this traditional form of lighting continues to be phased out (Europe started 2009, Canada in 2012). CFLs are energy efficient however they contain mercury, a toxic substance that requires special handling for disposal and in the case of bulb breakage. LEDs are a safer, longer lasting alternative to CFLs, however manufacturing White LEDs is a rather complicated and expensive procedure.

Pure materials (molecules or semiconductors) generally emit light in a narrow range of the visible spectrum making the design of white light emitters very challenging and costly. Currently, "White" LEDs are created by first creating a Blue LED and then applying an additional coating containing a mixture of different phosphors to create an approximate white appearance. These LED's use costly substrate material (i.e. sapphire). Another method of creating a White LED is more complicated and involves combining Red, Green, and Blue LEDs to approximate a white light.

Description of the invention

Researchers at the University of Waterloo have created a low-cost hybrid nanomaterial which illuminates pure white light and can be processed into light emitting structures and devices from liquid (i.e. solution) or solid (i.e. powder) forms. A white-light emitting system has been developed that can operate with high efficiency as a single entity, be prepared easily, reproducibly and at low cost by the electronic structure design. The hybrid material acts as a single illumination entity (chromophore), rather than a mixture, and provides a homogeneous and uniform white light emission. Because of its versatility and chemical compatibility this material can be used in various configurations and devices and can also be used to produce other colours of light.

Advantages

- 10x-100x cheaper material costs and higher efficiency (more lumens per watt).
- Can be integrated with existing solid state mfg. equipment or used in liquid solution applications (e.g. printing, spraying, casting which enables creating unusual LED shapes).

Potential applications

- Pure White LEDs for general lighting, display panel backlighting (TV, computer monitor, smartphone, etc.).
- Unique architectural applications.
- Potential solar panel applications.
- Potential to substantially increase the efficiency of florescent lights by increasing their UV efficiency
- Potential to eliminate the use of toxic materials in florescent lights

Reference

8810-7327/7393

Inventor(s)

Pavle Radovanovic et al.

Patent status

Issued US patent and applications in Europe and Canada

Stage of development

Working prototype

Contact

Scott Inwood
Director of Commercialization
Waterloo Commercialization Office
519-888-4567, ext. 33728
sinwood@uwaterloo.ca