Licensing Opportunity

Energy Efficient and Reduced Temperature White Light Generation by Up-conversion of Rare-Earth Materials Utilizing an Infrared Light Source

Advantages
• Higher electrical efficiency than traditional bulbs
• Cool temperature operation
• Produces a crisp and controllable white light source

Invention
The generation of white light by exposure of rare-earth materials to near-infrared sources, diode lasers or LEDs, and the various proposed embodiments as applied to a variety of white light applications [U.S. Patent 7,088,040]

Background
Efficient generation of white light is the focus of many optical research endeavors since traditional sources (light bulbs) simply convert electrical energy into light by heating a filament – an incredibly wasteful process. As anyone who has sat too close to an old TV knows, by combining red, blue, and green light at a distance one may create the illusion of any color, including ‘white’ light. It has therefore been hoped that by efficiently generating light of various colors we may combine them to produce an efficient light source to mimic natural sunlight.

UCF research sought to solve this problem by illuminating rare-earth materials, such as ytterbium-erbium or ytterbium-thulium, with invisible infrared light, which in turn re-radiates at a specific visible wavelength (color). This process, known as frequency up-conversion, has been applied to the problem of ‘white’ light generation to yield a versatile and significantly more energy efficient process that mixes red, blue, and green upconverting materials to produce white of any desired color intensity.

Application
This technology may be used to replace any source of white light that is considered too wasteful or hot. Brightness, color temperature, and illumination directions all may be controlled utilizing this energy efficient means of light generation. Manufacturers of light sources could utilize this invention to increase the capabilities of their products by making them run far cooler and in a more energy efficient manner. Such considerations could be vastly important for temperature sensitive materials or portable electronics.

Lead Inventor
M. Bass Ph.D.

Selected References

Contact: John Miner; University of Central Florida; Office of Research and Commercialization, 12201 Research Parkway, Suite 202, Orlando, FL 32826-3246 Phone: (407) 822-1136; Fax: (407) 882-9010; jminer@mail.ucf.edu; UCF IP # 30023