Efficient organic LEDs a step toward better lights

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(PhysOrg.com) -- For those who love "green" compact fluorescent bulbs but hate their cold light, here's some good news: Researchers are closer to flipping the switch on cheaper, richer LED-type room lighting.

University of Florida materials science and engineers have achieved a new record in efficiency of blue organic light-emitting diodes, or OLEDs. Because blue is essential to white light, the advance helps overcome a hurdle to lighting that is much more efficient than compact fluorescents — but can produce high-quality light similar to standard incandescent bulbs.

"The quality of the light is really the advantage," said Franky So, a UF associate professor of materials science and engineering and the lead investigator on the project.

The U.S. Department of Energy, which funded the research, reported the results on its Web site. Papers about it appeared earlier this year in the journal *Applied Physics Letters*.

OLEDs are similar to inorganic light emitting devices, or LEDs, but are built with organic semiconductors on large area glass substrates rather than inorganic semiconductor wafers. When used in display screens computer monitors, they have higher efficiency, better color saturation and a larger viewing angle. OLED displays are also used in cell phones, cameras and personal digital assistants. OLED flat panel TVs were introduced by Sony recently.

So and his team's blue OLED achieved a peak efficiency of 50 lumens — a lumen is a measure of brightness perceived by human eyes — per watt. That's a significant step toward the goal of his project: to achieve white light with efficiency higher than 100 lumens per watt.

So said the fact that OLEDs are highly "tunable" — each OLED is an individual light, which means differently colored OLEDs can be combined to produced different shades of light — puts warm, rich light easily within reach. "The quality of the light generated can easily be tuned by using different color emitters" he said. "You can make it red, green, blue or white."

Materials science engineering professor Paul Holloway and assistant professor Jiangeng Xue contributed to the research.

Provided by University of Florida