

Study looks at blue light-emitting diodes

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Japanese scientists have proposed a solution to the puzzle of why blue light-emitting diodes are so bright.

Despite huge commercial success, until now the reason for the unusual brightness has not been known. The material they are made from -- indium gallium nitride -- can only be fabricated to such a poor quality that it would not be expected to emit much light.

Shigefusa Chichibu and colleagues at the University of Tsukuba used positron annihilation spectroscopy to show the blue light emission originates from structures that consist of only a few atoms, which is what made them so difficult to observe in experiments.

The authors propose their results agree with an older model of structures formed from just three indium atoms in a chain, alternating with nitrogen, that is, In-N-In-N-In. The researchers suggest in the future, such tiny atomic arrangements might be created on purpose to achieve highly efficient light emission in other materials as well.

Shuji Nakamura, one of the authors of the paper, developed blue LEDs from nitride materials in 1993. For that achievement, he is to be presented Friday with Finland's Millennium Technology Prize.

The research appears in the journal *Nature Materials*.

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