Solid-state lighting

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Solid-state lighting (SSL) refers to a type of lighting that uses semiconductor light-emitting diodes (LEDs), organic light-emitting diodes (OLED), or polymer light-emitting diodes (PLED) as sources of illumination rather than electrical filaments, plasma (used in arc lamps such as fluorescent lamps), or gas.

An assortment of LED lamps commercially available as of 2010 as replacements for screw-in bulbs, including floodlight fixtures (left), reading light (center), household lamps (center right and bottom), and low-power accent light (right) applications

The term "solid state" refers commonly to light emitted by solid-state electroluminescence, as opposed to incandescent bulbs (which use thermal radiation) or fluorescent tubes. Compared to incandescent lighting, SSL creates visible light with reduced heat generation and less energy dissipation. Most common "white" LEDs convert blue light from a solid-state device to an (approximate) white light spectrum using photoluminescence, the same principle used in conventional fluorescent tubes.

The typically small mass of a solid-state electronic lighting device provides for greater resistance to shock and vibration compared to brittle glass tubes/bulbs and long, thin filament wires. They also eliminate filament evaporation, potentially increasing the life span of the illumination device.

Solid-state lighting is often used in traffic lights and is also used frequently in modern vehicle lights, street and parking lot lights, train marker lights, building exteriors, remote controls etc.[1] Controlling the light emission of LEDs may be done most effectively by using the principles of nonimaging optics.[2]

Solid state lighting has made significant advances in industry. In the entertainment lighting industry, standard incandescent tungsten-halogen lamps are being replaced by solid-state light lighting fixtures.[3]

See also

- LED lamp
- List of light sources
- Stage lighting
- Light-emitting diode
- L Prize
- OLED
- Nonimaging optics
- Smart lighting

References

1. California Sustainability Alliance Solid State Lighting (http://sustainca.org/techshowcase/ssl/case_studies), Received July 24th, 2010
2. Chaves, Julio (2015). *Introduction to Nonimaging Optics, Second Edition*. CRC Press. ISBN 978-1482206739.
3. Kho, Mu-Jeong, Javed, T., Mark, R., Maier, E., and David, C. (2008) 'Final Report: OLED Solid State Lighting: Kodak European Research' MOTI (Management of Technology and Innovation) Project, Judge Business School of

the University of Cambridge and Kodak European Research, Final Report presented on 4 March 2008 at Kodak European Research at Cambridge Science Park, Cambridge, UK., pages 1-12

Further reading

- *Assessment of Advanced Solid State Lighting*. National Academies Press. 2013.
- Kho, Mu-Jeong, Javed, T., Mark, R., Maier, E., and David, C. (2008) 'Final Report: OLED Solid State Lighting: Kodak European Research' MOTI (Management of Technology and Innovation) Project, Judge Business School of the University of Cambridge and Kodak European Research, Final Report presented on 4 March 2008 at Kodak European Research at Cambridge Science Park, Cambridge, UK., pages 1–12.

External links

- EUROPEAN METROLOGY RESEARCH PROJECT - METROLOGY FOR SOLID STATE LIGHTING (http://www.m4ssl.npl.co.uk/)
- Solid State Lighting, International Energy Agency research project (http://ssl.iea-4e.org)
- DOE SSL roadmap (http://www.netl.doe.gov/ssl/strategy.html)
- Lighting Research Center - Solid-State Lighting Program (http://www.lrc.rpi.edu/programs/solidstate/index.asp)
- OLLA: finished European academic-industrial research project into OLED lighting (http://www.olla-project.org/)
- OLED100.EU: successor to the OLLA project (http://www.oled100.eu/)

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