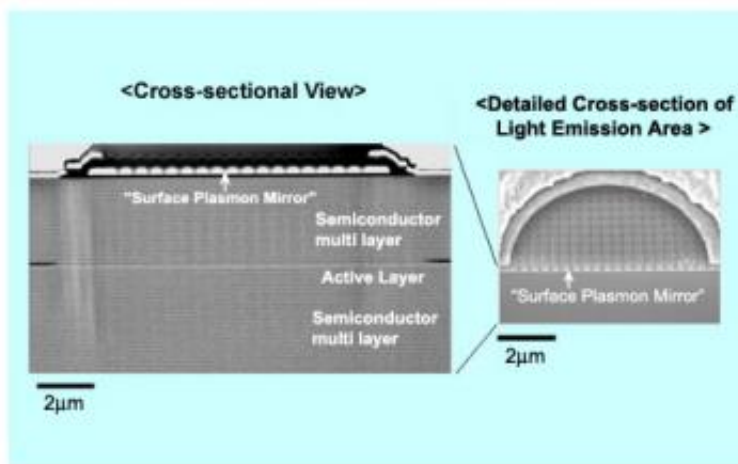


# Panasonic Develops VCSEL Laser with Surface Plasmon Mirrors

May 25 2006



**Surface Emitting Laser (VCSEL) with "Surface Plasmon Mirrors"**  
**Matsushita Electric Industrial Co., Ltd. May 2006**

Panasonic today announced the development of a novel VCSEL (Vertical Cavity Surface Emitting Laser) utilizing an epoch-making physical phenomenon called as surface plasmon resonance. This is the world first demonstration of high output power in the VCSEL taking advantage of the surface plasmon resonance. The laser is applicable to practical high speed and short distance optical communication such as optical interconnection and plastic fiber communication.

The VCSEL features a novel "Surface Plasmon Mirror" in which a

periodic silver nano-holes array is formed. The laser successfully achieves both high output power and low threshold current by effectively controlling the reflectance and the transmittance at the mirror. The VCSEL can reduce the power consumption in optical communication systems.

The surface Plasmon resonance drastically enhances optical transmission through the silver nano-holes array at an optimized pitch of the holes resulting in high optical output of 2mW. The used silver is known as the metal exhibiting the maximum resonant effect as well as very high reflectance. The enhanced reflectance at the mirror successfully reduces the threshold current down to 0.5mA.

In addition, fabrication process of the silver nano-holes is successfully established using electron beam lithography. In order to avoid any degradation of the silver, the nano-holes are entirely covered by dielectric films such as silicon nitride.

Applications for forty three domestic and eleven international patents have been filed. These research and development results have been presented at Conference on Lasers and Electro-Optics (CLEO) 2006, held in Long Beach, California, U.S. from May 21 to 26, 2006.

Source: Panasonic

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