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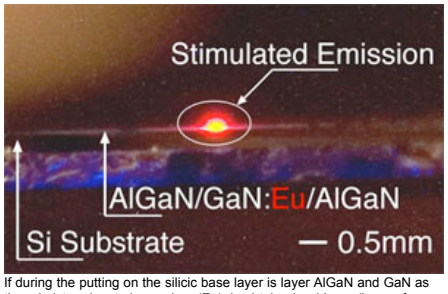
The silicic laser, which works in the visible region is created

21.10.05 | Physics, *Aleksandr Sergey* | To comment on



If during the putting on the silicic base layer is layer AlGaN and GaN as the admixture is used europium (Eu), is obtained red laser (image from site optics.org)

American of physics from University of Cincinnati, the state of Ohio, they declared about the creation of the first in the world silicic laser, which works in the visible radiation band. Previously infrared silicic lasers were demonstrated by researchers from The University of California and from company Intel.

About the creation of silicic laser semiconductor companies dreamed decades. The majorities of contemporary microcircuits, including processors, are made on the silicic basis. However, for joining silicic electronics with optical data links were always required the separate peripheral devices, prepared from other materials and on another technology. It is understandable that this considerably complicated and raised in price optico-electronic equipment.

Created in Intel silicic laser it gives hope for the solution of this problem. Laser emission was possible to generate directly in the silicic crystal, which was processed on the usual technology, utilized in the production of silicic microcircuits. But intelovskiy laser works only in the infrared region, whereas in the transmission of data the more high-frequency emission of the visible region increasingly more frequently is used.

The new development of the university of Cincinnati makes it possible to create the silicic lasers, which work both in the infrared, and in the visible region, reports site Optics.org. But for this it was necessary to be received to the most important reaching Intel: for the work of new laser it is insufficient pure silicon. To the silicic base layer it is necessary to apply the thin crystalline layers of the substance of the strictly defined composition.

One layer consists of aluminum, gallium and nitrogen (AlGaN), the second - from gallium and nitrogen (GaN) with the admixture of different rare-earth elements. These layers are applied by the method the molecular- beam epitaxy, when on the surface of one single crystal of the molecules spray-coated in the vacuum another is reared.

Key parameter of laser - composition of rare-earth admixture. Thus, with the use as the admixture of the element europium (Eu) is obtained red laser, with the use erbium (Er) - green or infrared, and with the application thulium (Tm) - blue.

It is understandable that the need for using epitaxy and rare-earth elements will not make it possible to produce such "silicic" lasers strictly on the usual technology. But nevertheless similar procedure can be theoretically built-in the existing technological lines, spray-coating these layers only in that section of the silicic crystal of microcircuit, which it will answer for the generation of emission. This will complicate the production of microcircuits, but will free from the need for assembling optico-electronic devices from several separate parts.

True, before the practical application of new development one must solve one additional serious problem. New laser, as silicic infrared laser from Intel, pumps by another source of laser emission. In this case pulsed (600 picoseconds) ultraviolet (337,1 nm) nitric laser is used. But for the industrial use of silicic lasers it is completely necessary to pass for the electrical pumping. Developers from the university of Cincinnati assert that in their technology this to make more simply than in technology Intel and the University of California. How they are right, time will show.

Aleksandr Sergey

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