ALEXANDRITE LASERS

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Alexandrite crystals

These types of crystals are known for their high absorption coefficient in the spectral region of red diodes; therefore, many uses and potential applications. They have been investigated due to a sharp absorption peak at ~638nm. The main reason alexandrite lasers have been developed is in efforts to find an alternative to titanium sapphire lasers; these being old and expensive technology. Whereas the alexandrite has a high output power and high efficiency compared to previous systems.

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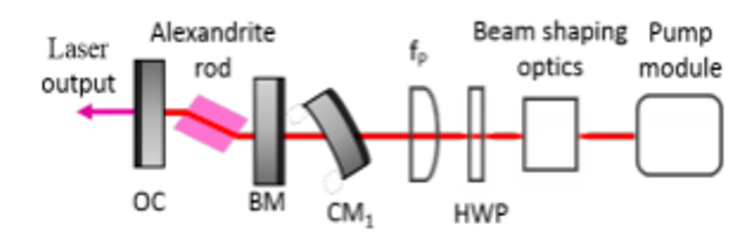
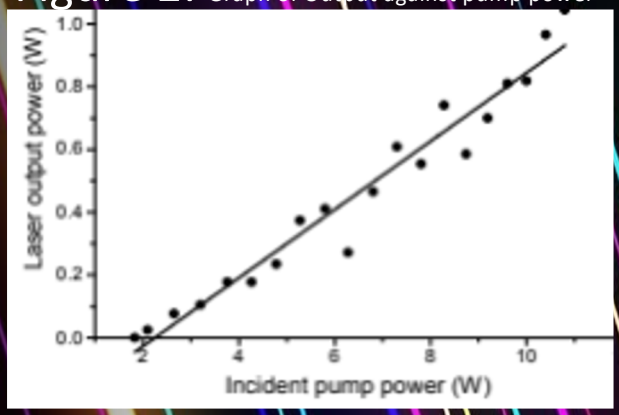
Figure 1: Schematic of diode-pumped Alexandrite Brewster-cut rod with compact linear laser cavity.



Applications/uses

LIDAR - The main application for alexandrite lasers is for LIDAR. LIDAR lasers can be used to measure the density of vegetation by using infrared waves, where the density of the waves reflected from the tree line are proportional to the density of the vegetation. These lasers are fired from satellites and alexandrite crystals can be used.

Figure 2: Graph of Output against pump power



Types of lasers:

Semiconductor lasers – lasers that use electricity to create lasing conditions at the diode junction. These types of lasers are used in laser pointers for example.

Solid state lasers – these types of lasers are optically pumped so; electrons get raised from a lower energy level in an atom or molecule to a higher one. These are commonly used in experiments because of their cheapness and accessibility.

References

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