

# Nd,Cr:YAG crystals

The YAG (yttrium aluminium garnet) laser can be doped with chromium and neodymium in order to enhance the absorption characteristics of the laser. The NdCrYAG laser is a solid state laser. Chromium ion ( $\text{Cr}^{3+}$ ) has a broad absorption band; it absorbs the energy and transfers it to the neodymium ions ( $\text{Nd}^{3+}$ ) by way of dipole-dipole interactions. Wavelength of  $1.064 \mu\text{m}$  is emitted by this laser.

The laser action of Nd-YAG laser was first demonstrated at the Bell Laboratories in the year 1964. The Nd,CrYAG laser is pumped by a solar radiation.



By doping with chromium, the energy absorption capacity of the laser is enhanced and ultra short pulses are emitted. Typical applications of this laser include production of nanopowders and as a pumping source for other lasers.

## Nd,Cr:YAG crystals



- The primary application of Nd:Cr:YAG laser is as a pumping source. It is used in solar pumped lasers, which would be used as a solar-powered satellite system.
- Another application of Nd:Cr:YAG laser is in experimental production of nanopowder.

Basic properties	
Laser type	Solid
Pump source	Solar Radiation
Operating wavelength	1.064 $\mu\text{m}$
Chemical formula	$\text{Nd}^{3+}:\text{Cr}^{3+}:\text{Y}_3\text{Al}_5\text{O}_{12}$
Crystal structure	Cubic
Melting point	1970°C
Hardness	8-8.5
Thermal conductivity	10-14 W/mK
Young's modulus	280 GPa