Laser rods - Ytterbium doped

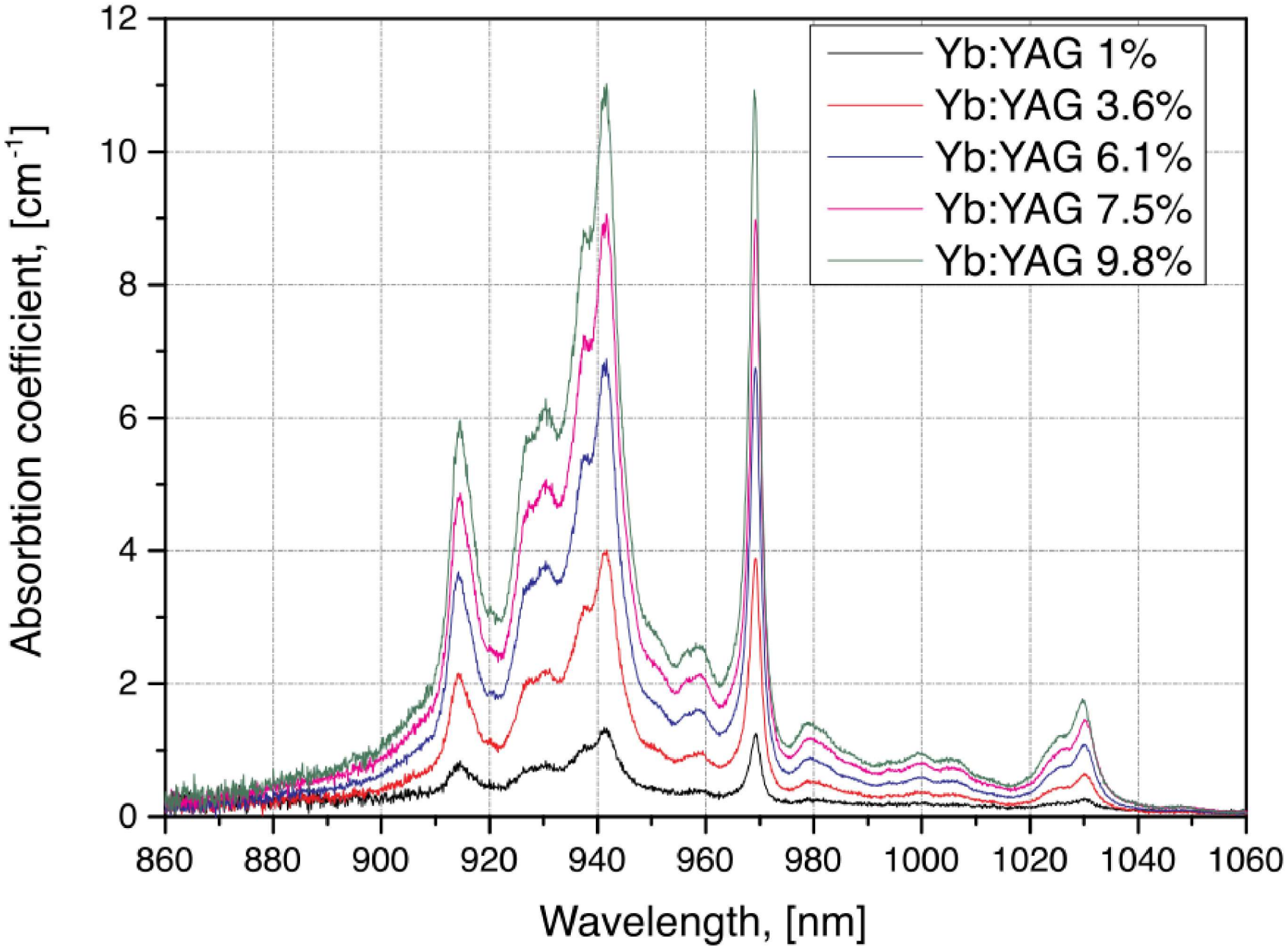
Crytur delivers high quality laser rods based on proprietary crystals and in-house processing and coating

YB:YAG **YB:LUAG**

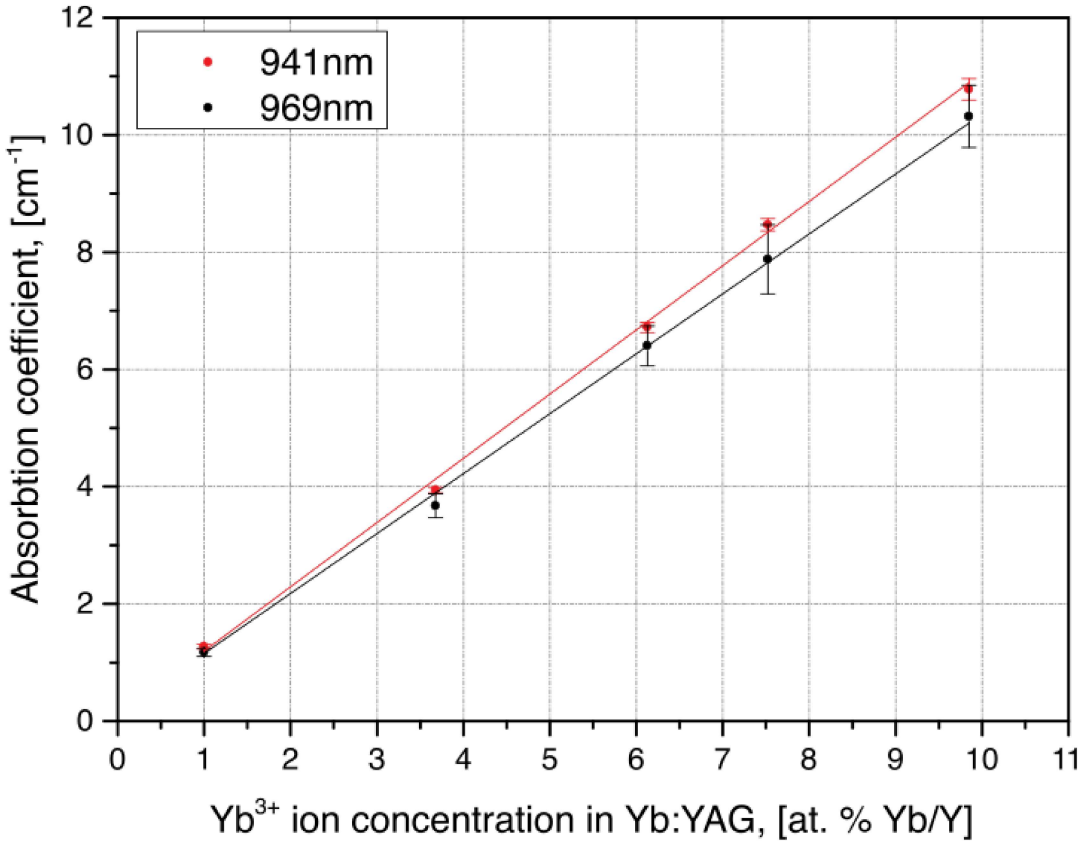
The Yb^{3+} ion exhibits a small quantum defect and a quasi-three level system with a long upper laser level lifetime, which is important for energy accumulation in Q-switched lasers.

The wide luminescence band of Yb^{3+} is advantageous for the generation of sub-picosecond pulses. Long energy storage lifetime, broad absorption band at 940 nm and very low quantum defect make Yb:YAG crystal superior candidate for diode-pumped high-energy lasers.

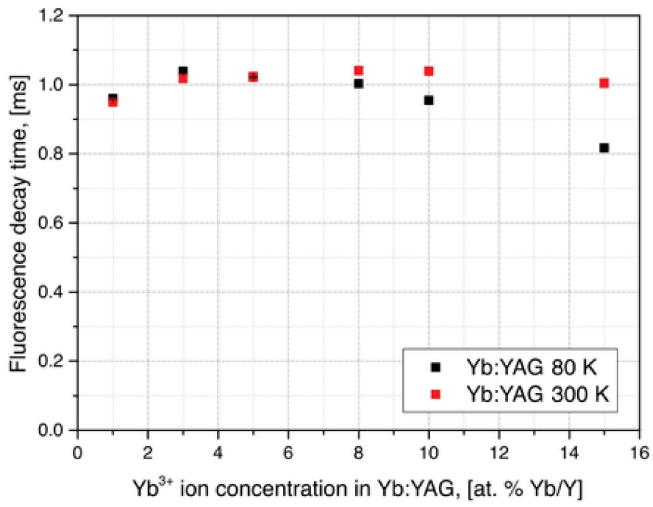
Absorbtion spectrum of Yb:YAG



Absorbtion coefficient of Yb:YAG



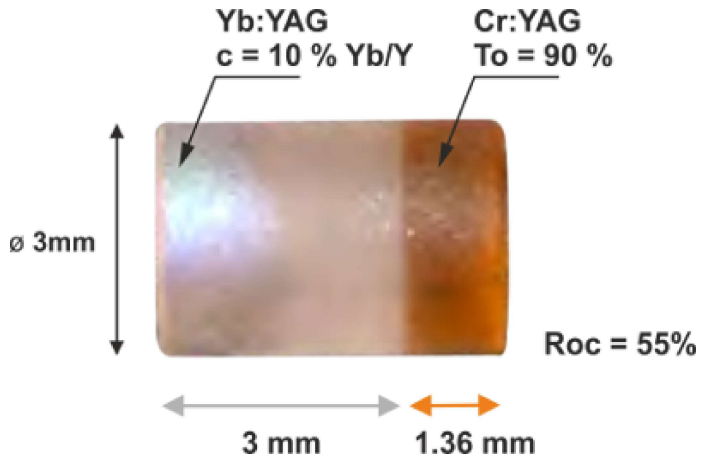
Fluorescence decay time of Yb:YAG



MATERIAL CHARACTERISTICS	
Crystal structure	cubic - la3d
Emission wavelength	1030 nm
Pump bands	941 nm, 969 nm
Refractive index at 632 nm	1.83
Absorption cross section at 940 nm	8.2×10^{-21} cm^2

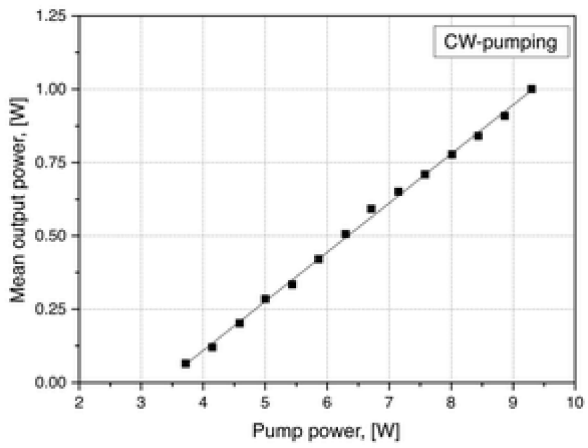
Emission cross section at 2013 nm	2.1 x 10^{-20} cm^2
DESIGN	
Rod or disc diameters	2 – 80 mm
Rod length or disc thickness	0.1 - 100 mm
Doping concentration	1 – 10 at.%
Polishing	Barrel surface fine ground or polished. Perpendicular or wedged ends. Polishing according to DIN and MIL standards.
Coatings	HfO_2 based high reflectors, output couplers or antireflective coating

Application example: Q-Switched Yb:YAG-Cr:YAG microchip laser



The Yb:YAG/Cr:YAG microchip laser threshold pumping power was found to be 3.3 W. With th e increasing pumping power the mean output power, and generated pulse repetition rate also incr eased up to 1 W and 13.6 kHz, respectively, for the pumping power 9.3 W. The maxim output po wer was reached without observable thermal roll-over.

The laser slope efficiency in respect to incident pumping po wer was ≈ 17 %. The average pulse width was 1.58 ± 0.04 n s. The maximum pulse energy and peak power value were 7 3.8 ± 0.7 µJ, and 46.0 ± 0.8kW, respectively.



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