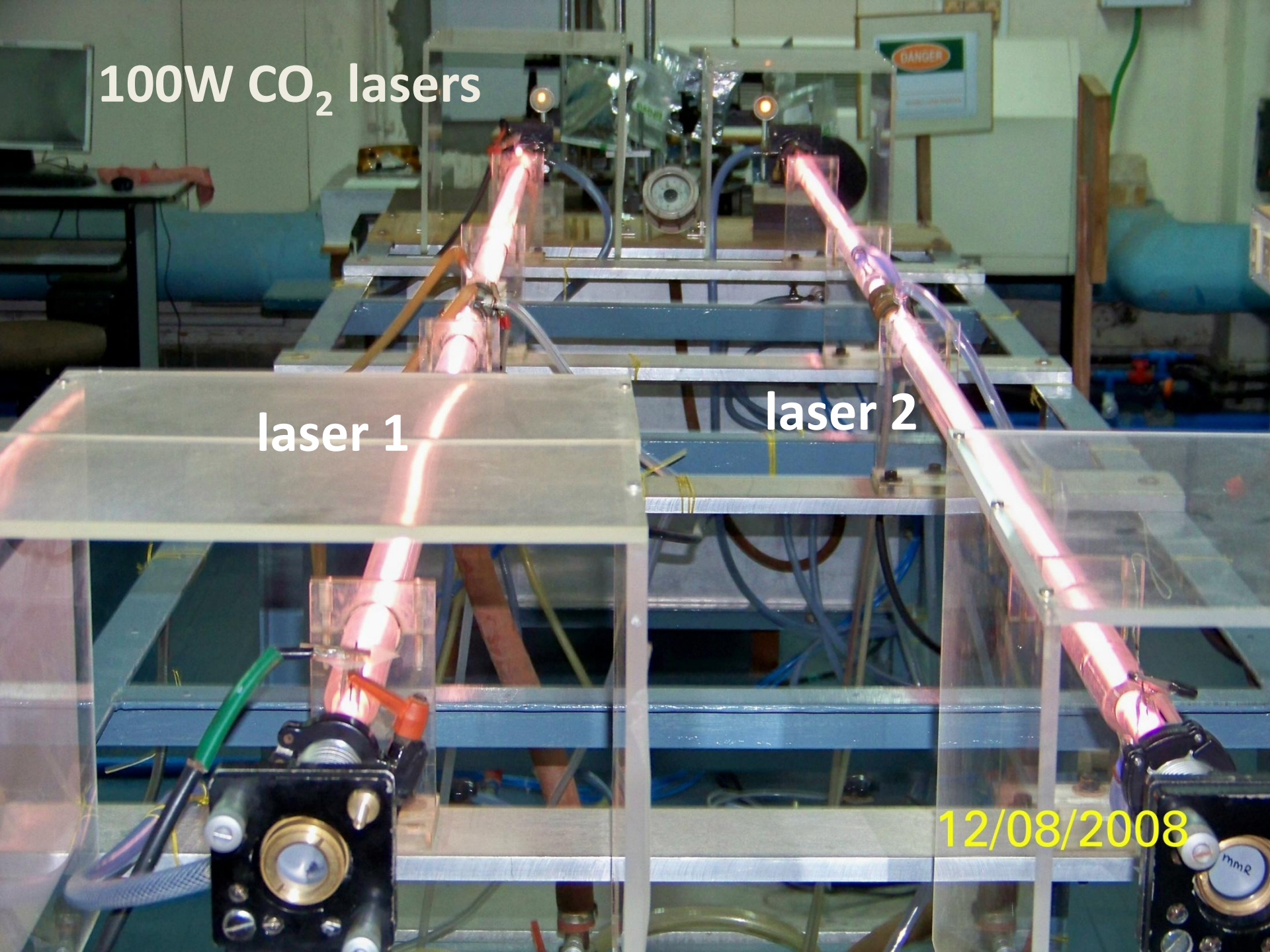
Equipment/facilities available

100W CO_2 laser


100W CO_2 lasers
laser 1
laser 2
12/08/2008

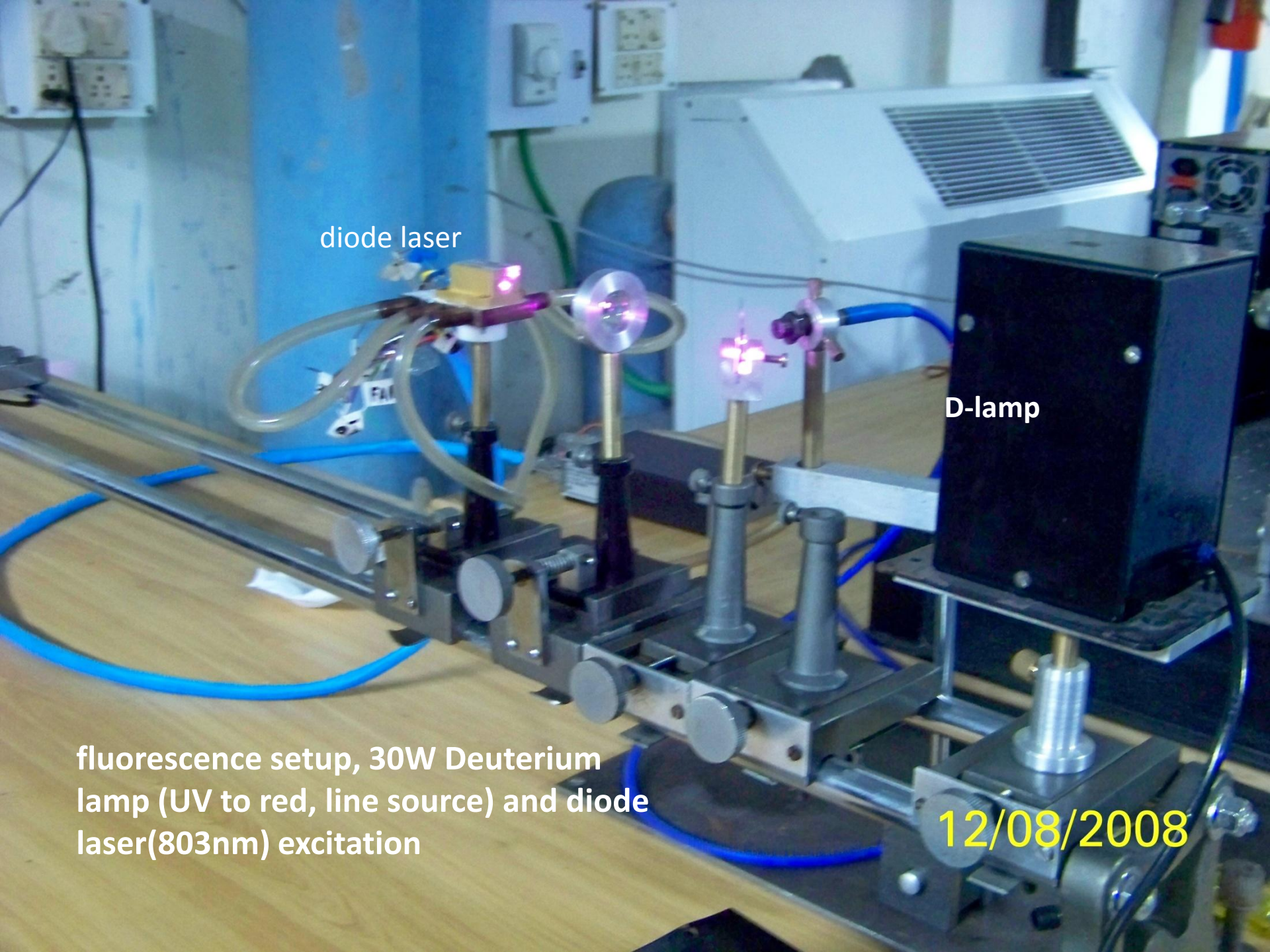
15KV, 300mA DC power supplies

Power supply- 1

DANGER

HIGH VOLTAGE

12/08/2008

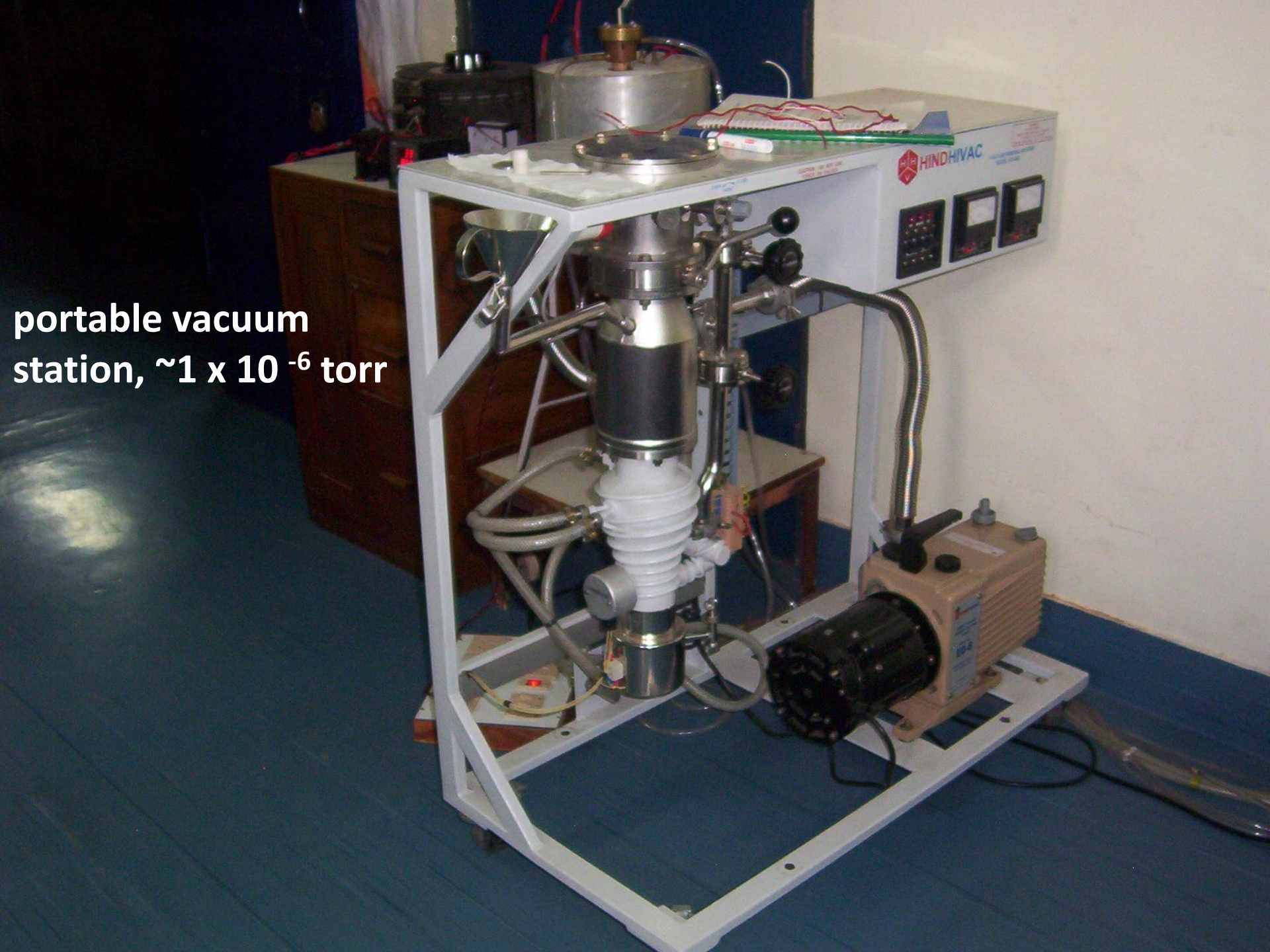


fluorescence setup, 30W Deuterium lamp (UV to red, line source) and diode laser(803nm) excitation

chemical synthesis facility

12/08/2008


furnace 1
furnace 2
furnace 3
074
504
536
Temperature ± 1 °C
furnace 1: 500 °C max; air
furnace 2: 1200 °C max; air
Furnace 3: 1200 ° C max; oxygen/nitrogen/He
12/08/2008

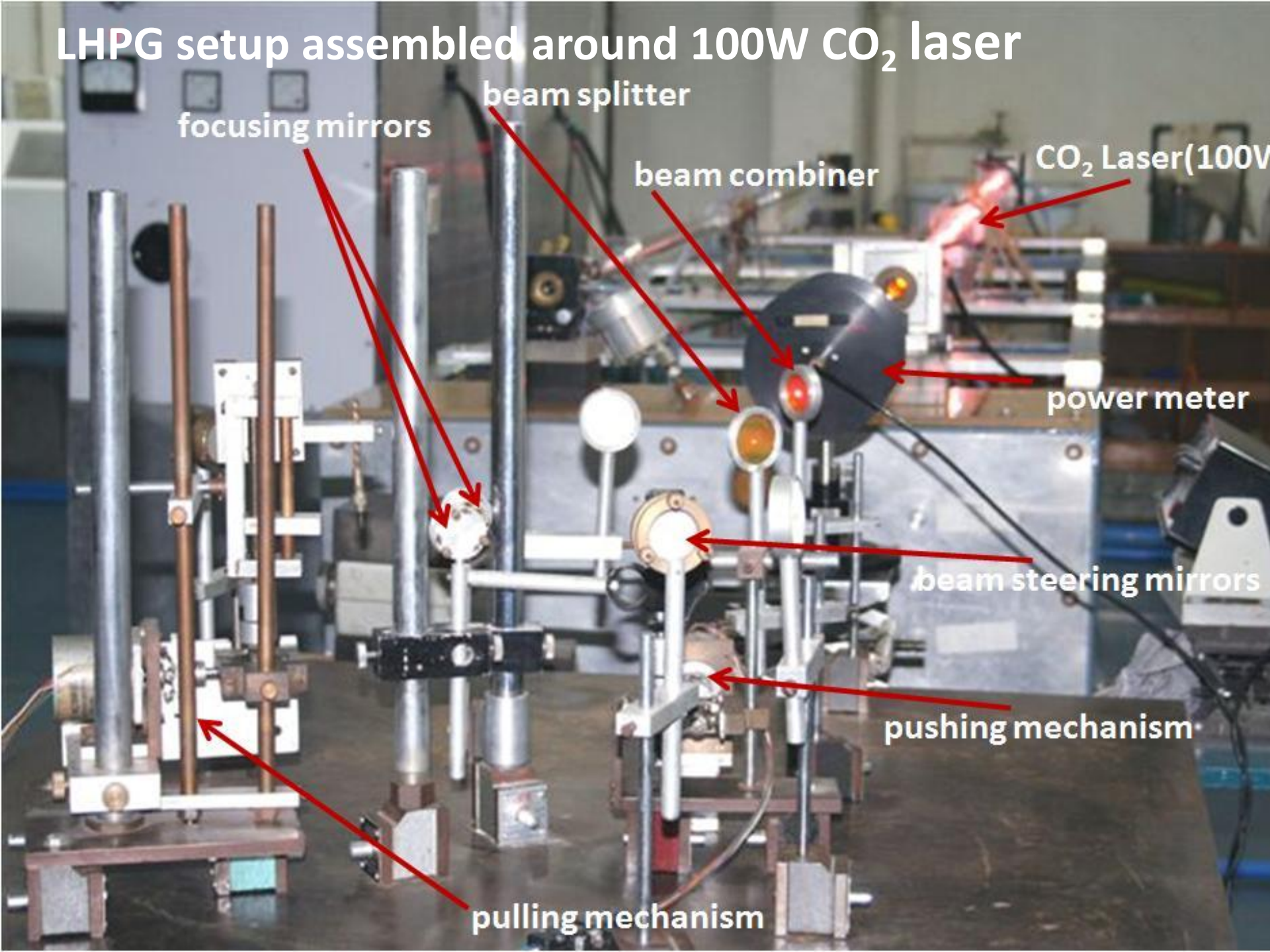


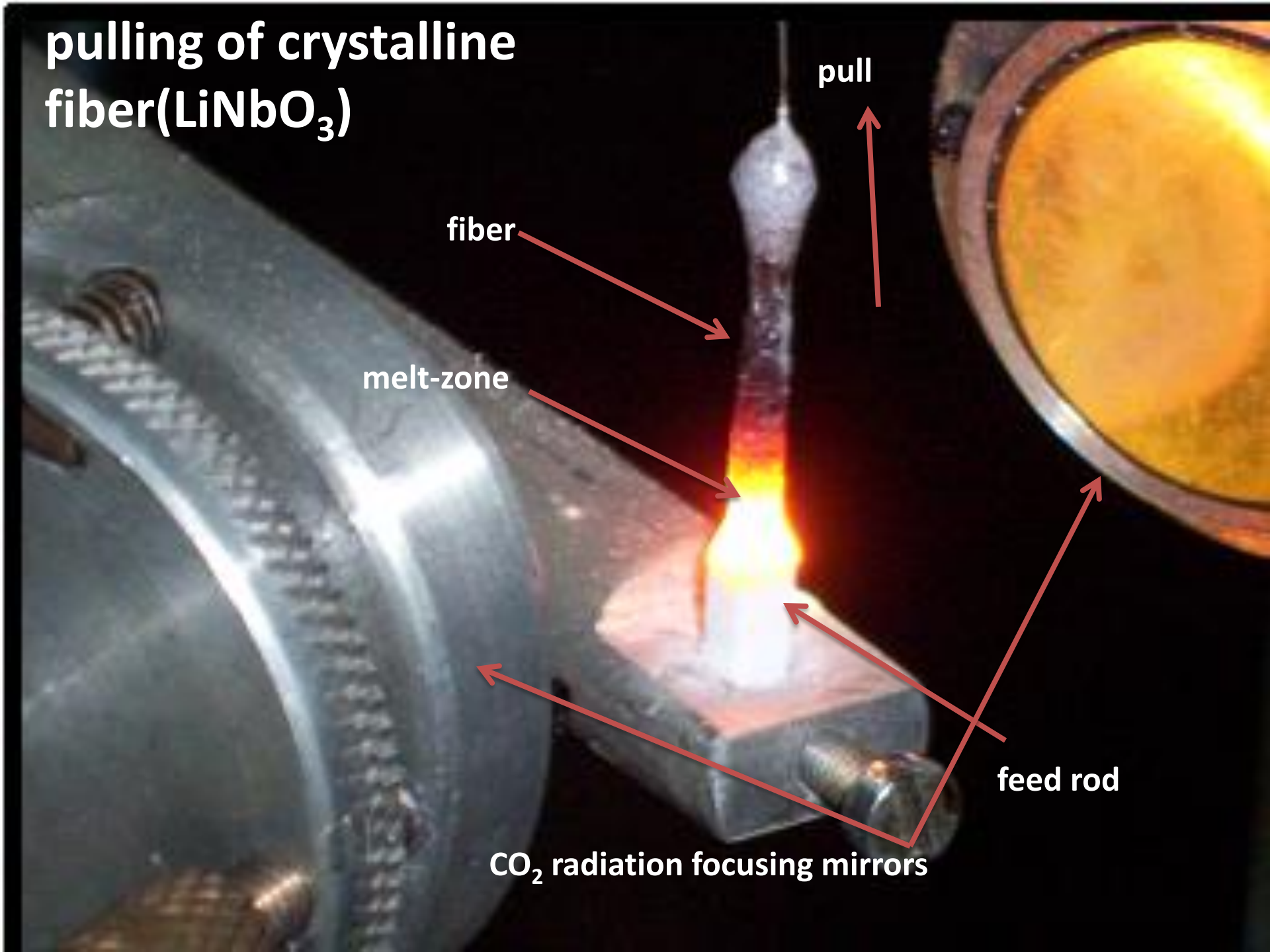
portable vacuum station, ~1 x 10^{-6} torr

Research

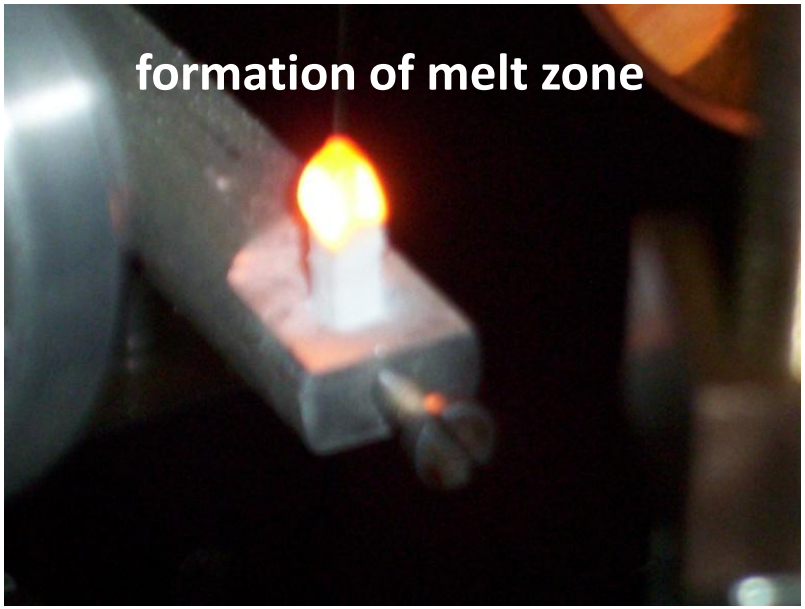
(i) Laser heated pedestal growth (LHPG) of optical materials; $LiNbO_3$, Nd:$LiNbO_3$, LAP, dye : LAP and KDP:LAP

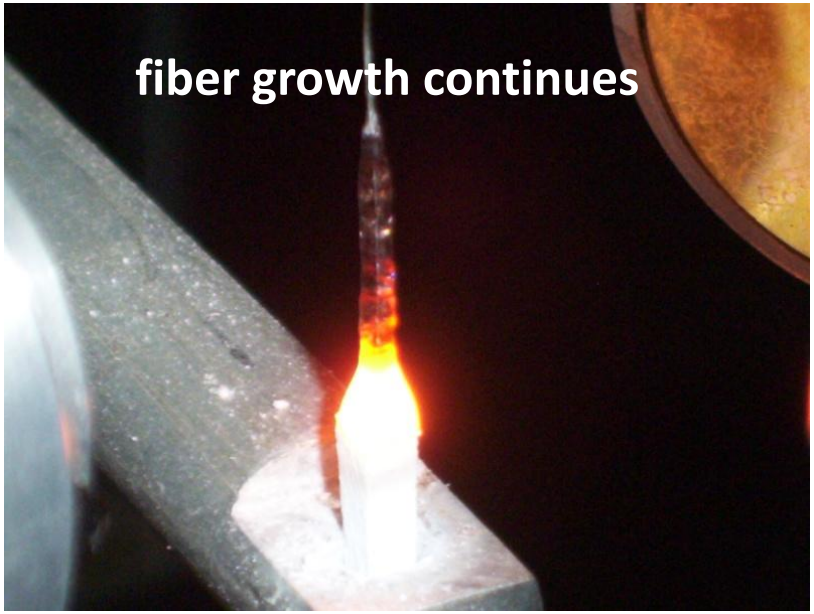
(ii) Laser sintering of rare-earth doped YAG and TAG

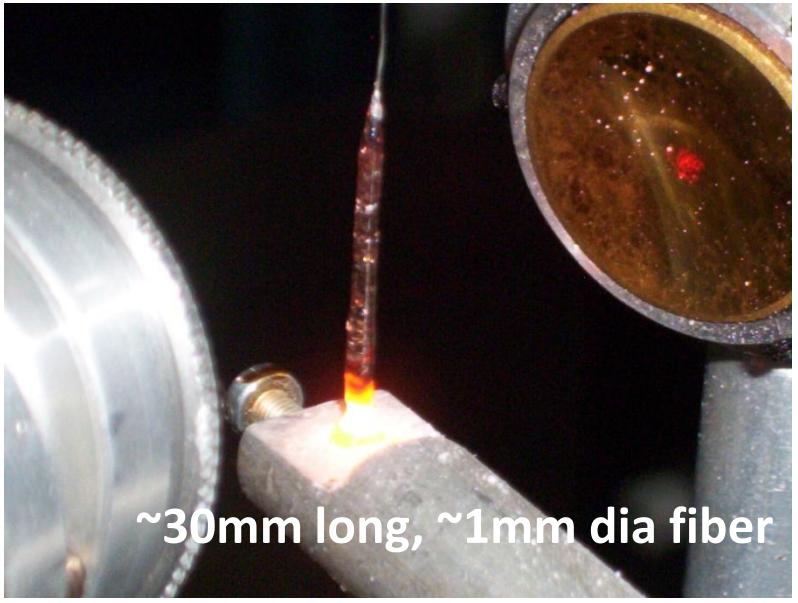

LHPG setup assembled around 100W CO_2 laser
beam splitter
focusing mirrors
beam combiner
CO_2 Laser(100W
power meter
beam steering mirrors
pushing mechanism
pulling mechanism

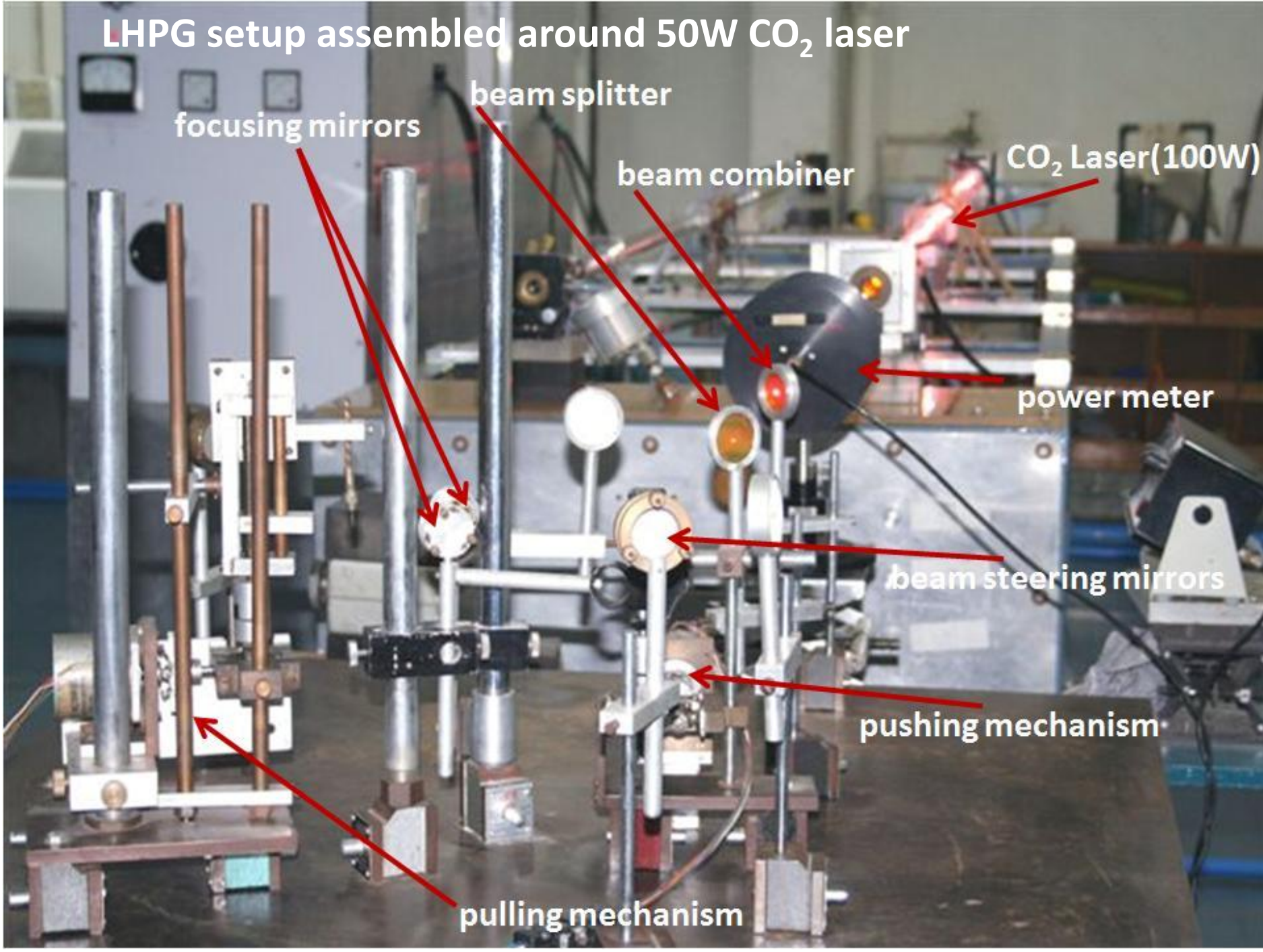

pulling of crystalline fiber($LiNbO_3$)
pull
fiber
melt-zone
feed rod
CO_2 radiation focusing mirrors

Typical growth cycle ($LiNbO_3$)

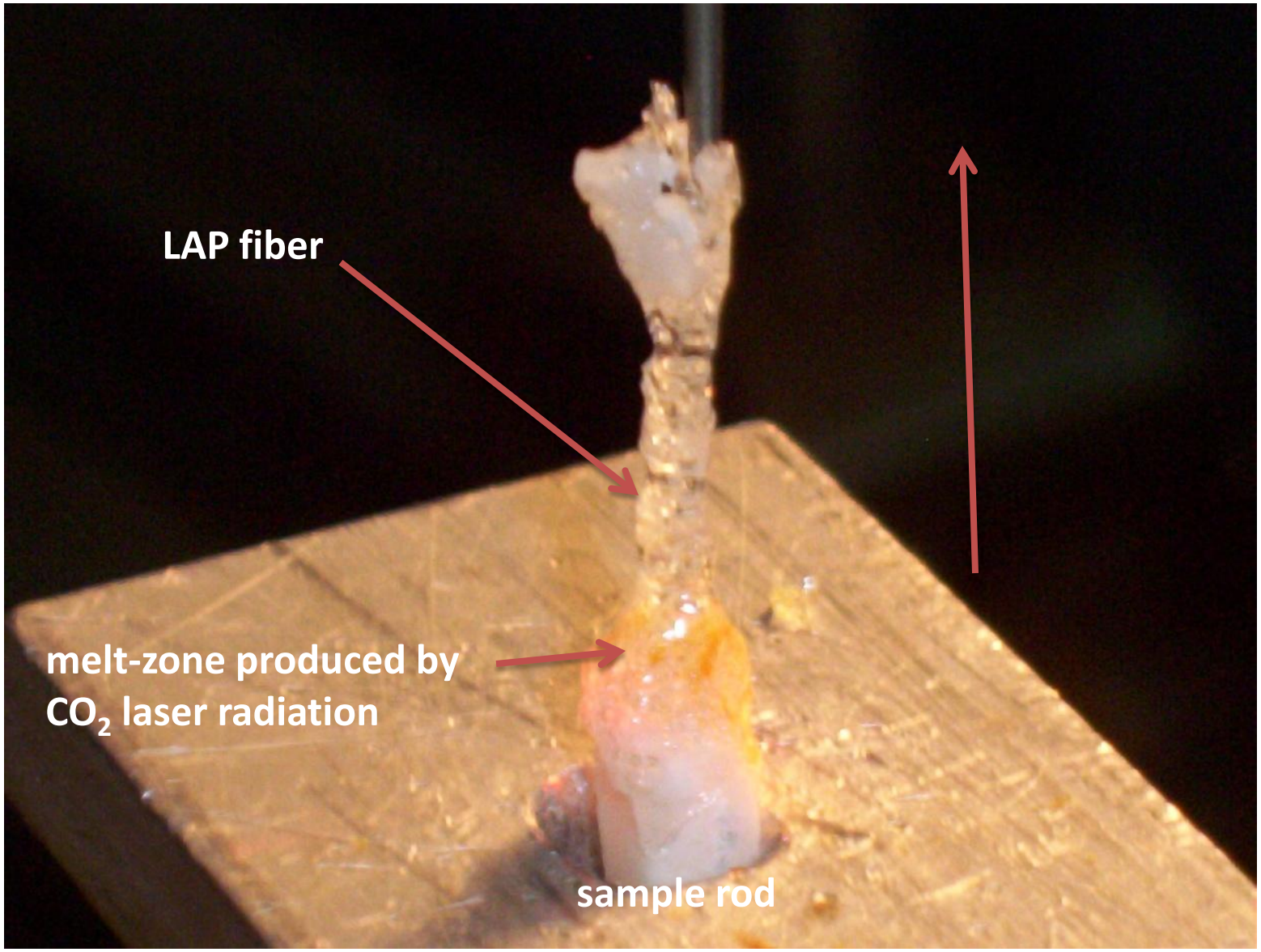




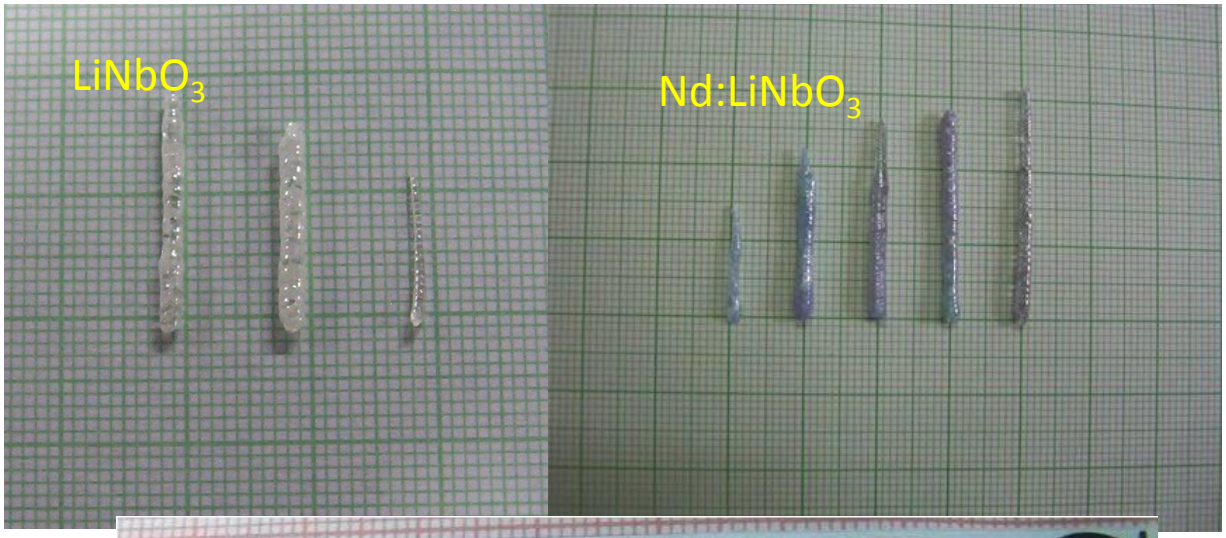


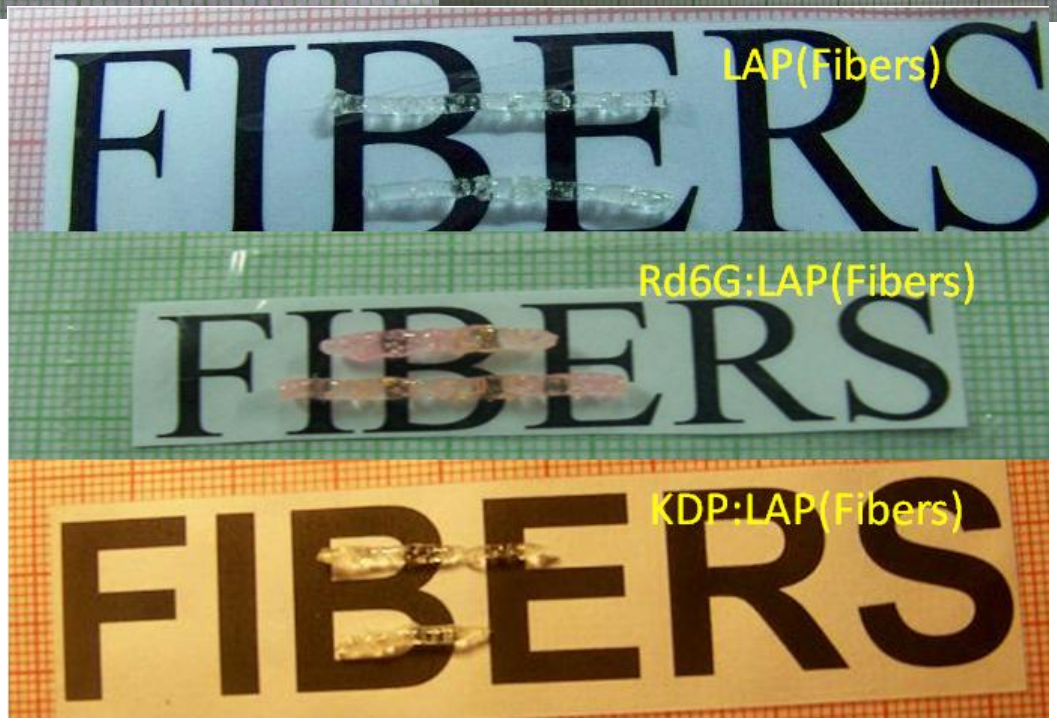

LHPG setup assembled around 50W CO_2 laser
beam splitter
focusing mirrors
beam combiner
CO_2 Laser(100W)
power meter
beam steering mirrors
pushing mechanism
pulling mechanism

Typical fiber growth of organic material LAP

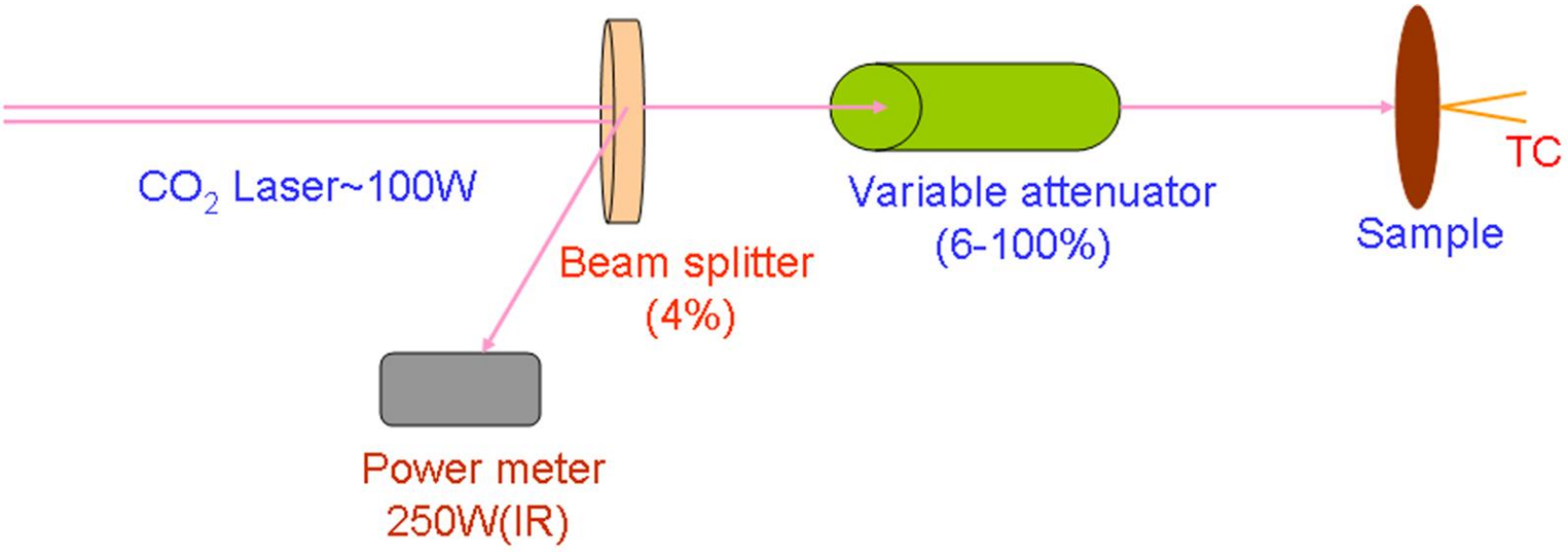


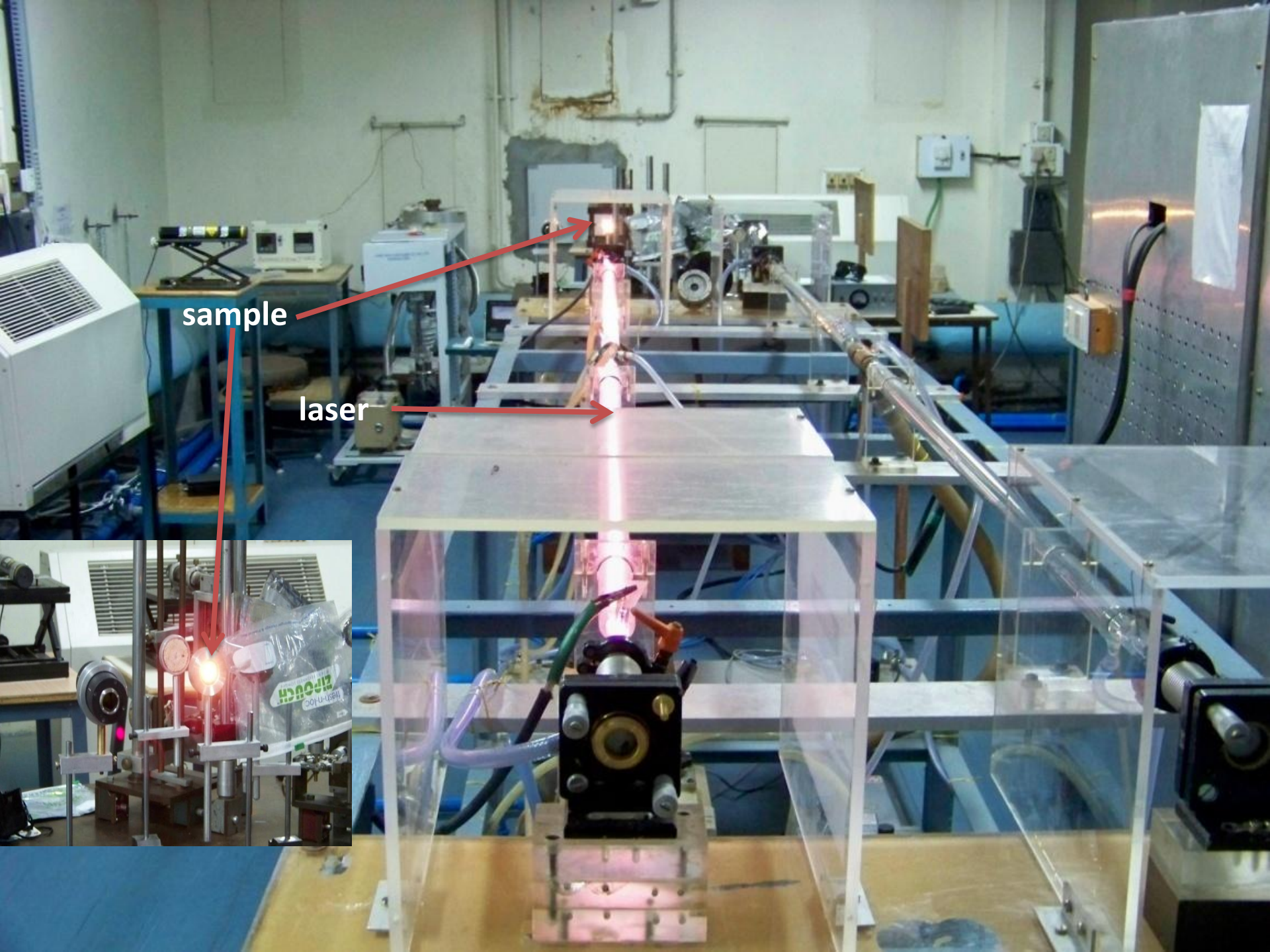
" As grown" crystalline fibers



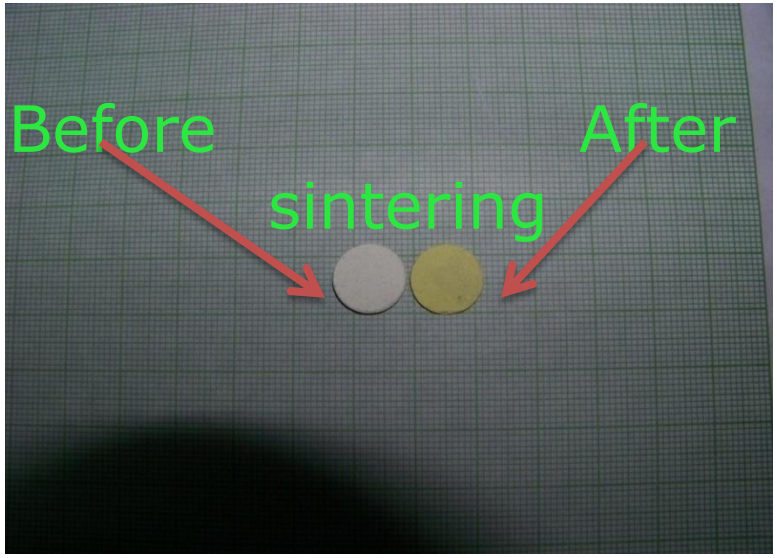


Laser sintering setup(schematics)




sample
laser

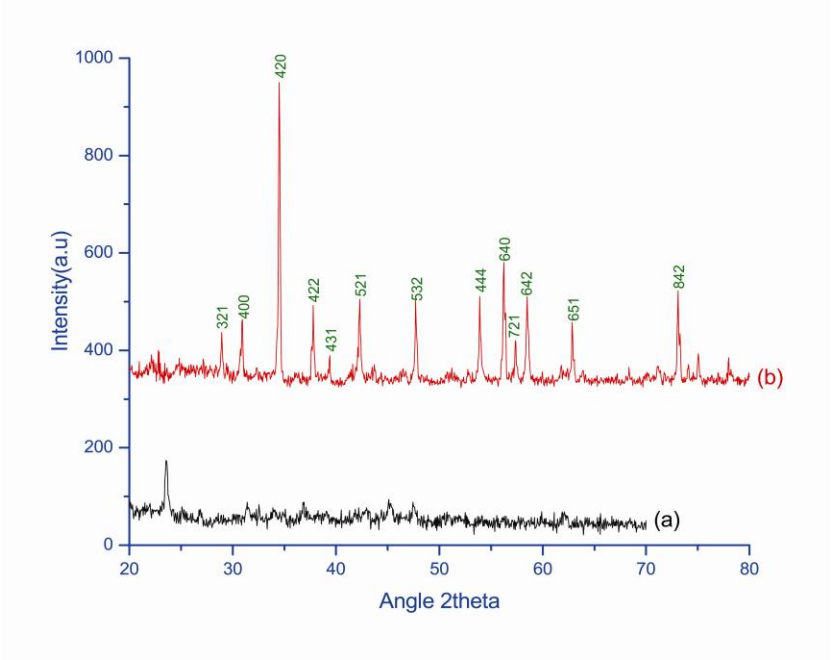
Results



Ce:YAG sample

White before laser irradiation

Yellow after laser irradiation



Powder XRD of laser sintered Ce:YAG.

(a) precursor

(b) irradiated by ~80W CW CO_2 laser for about 2 hours

XRD match well with the reported in literature