

Supplementary information

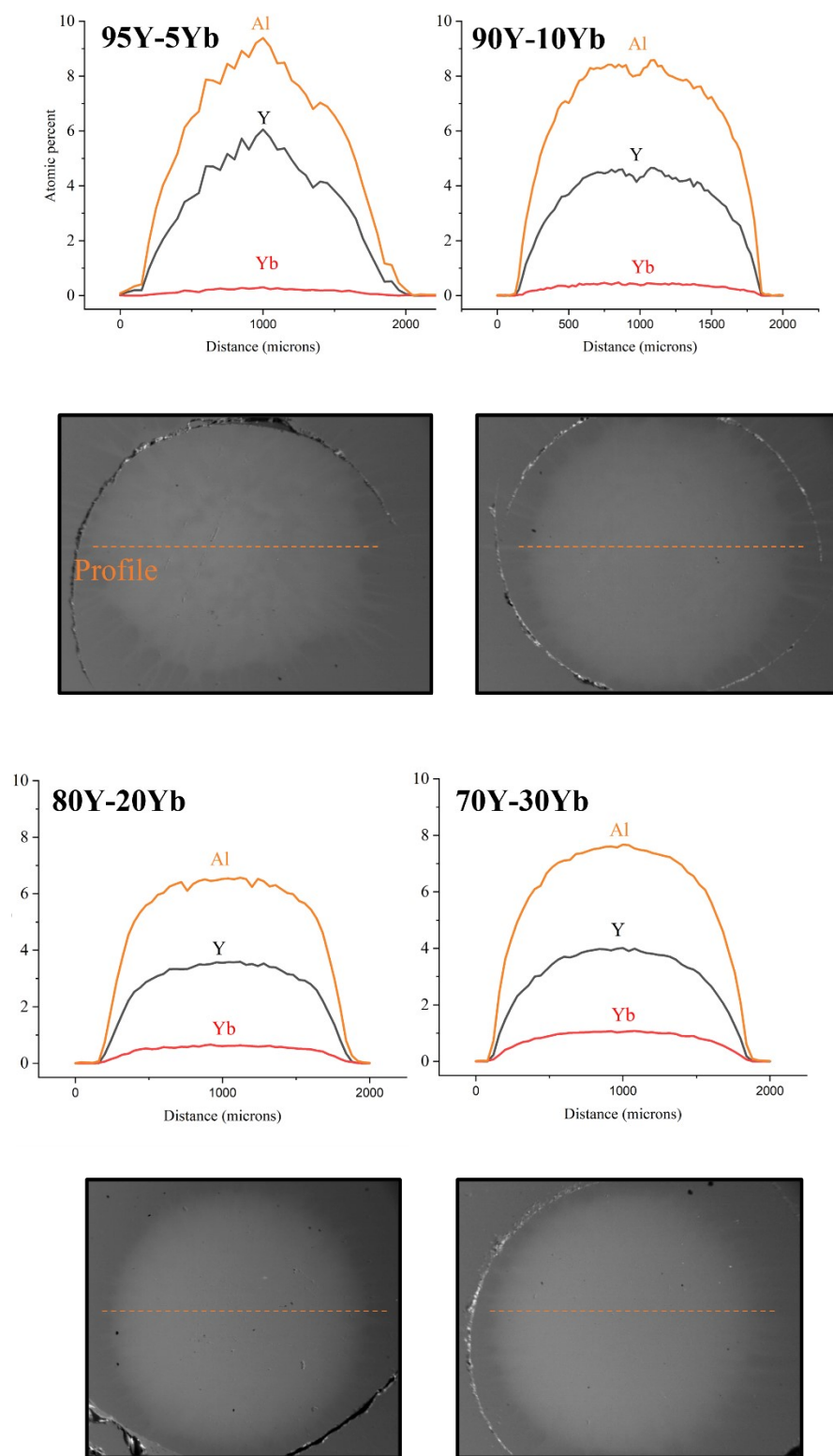


Figure 1. Electron probe analysis measurements of YAS glass samples

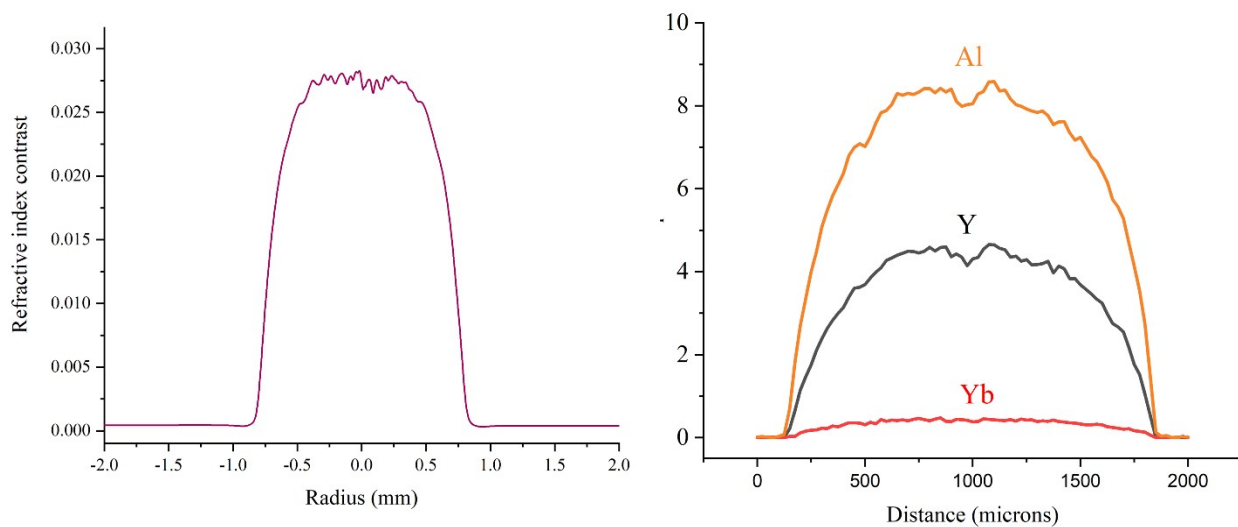


Figure 2. Refractive index profile, extracted from preform 90Y-10Yb

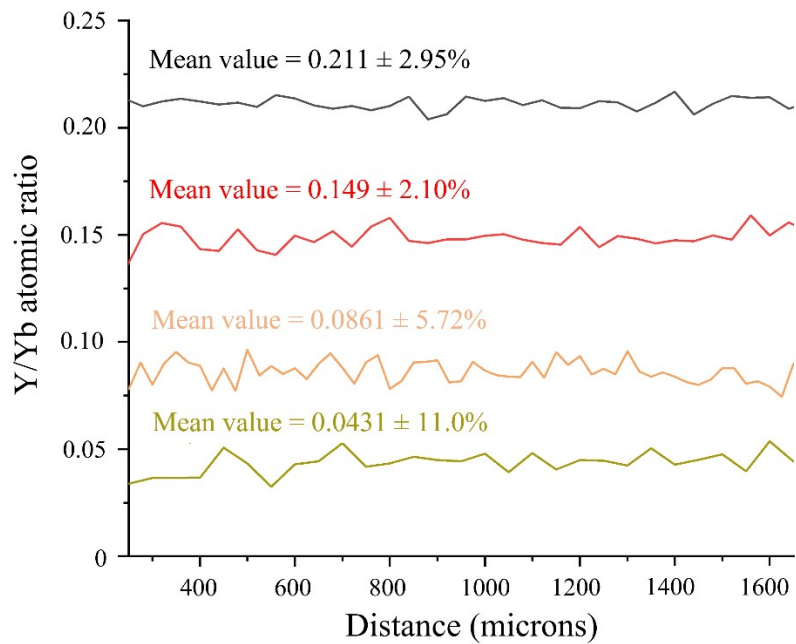


Figure 3. Experimental ratio of Yttrium to ytterbium, calculated from EPMA data

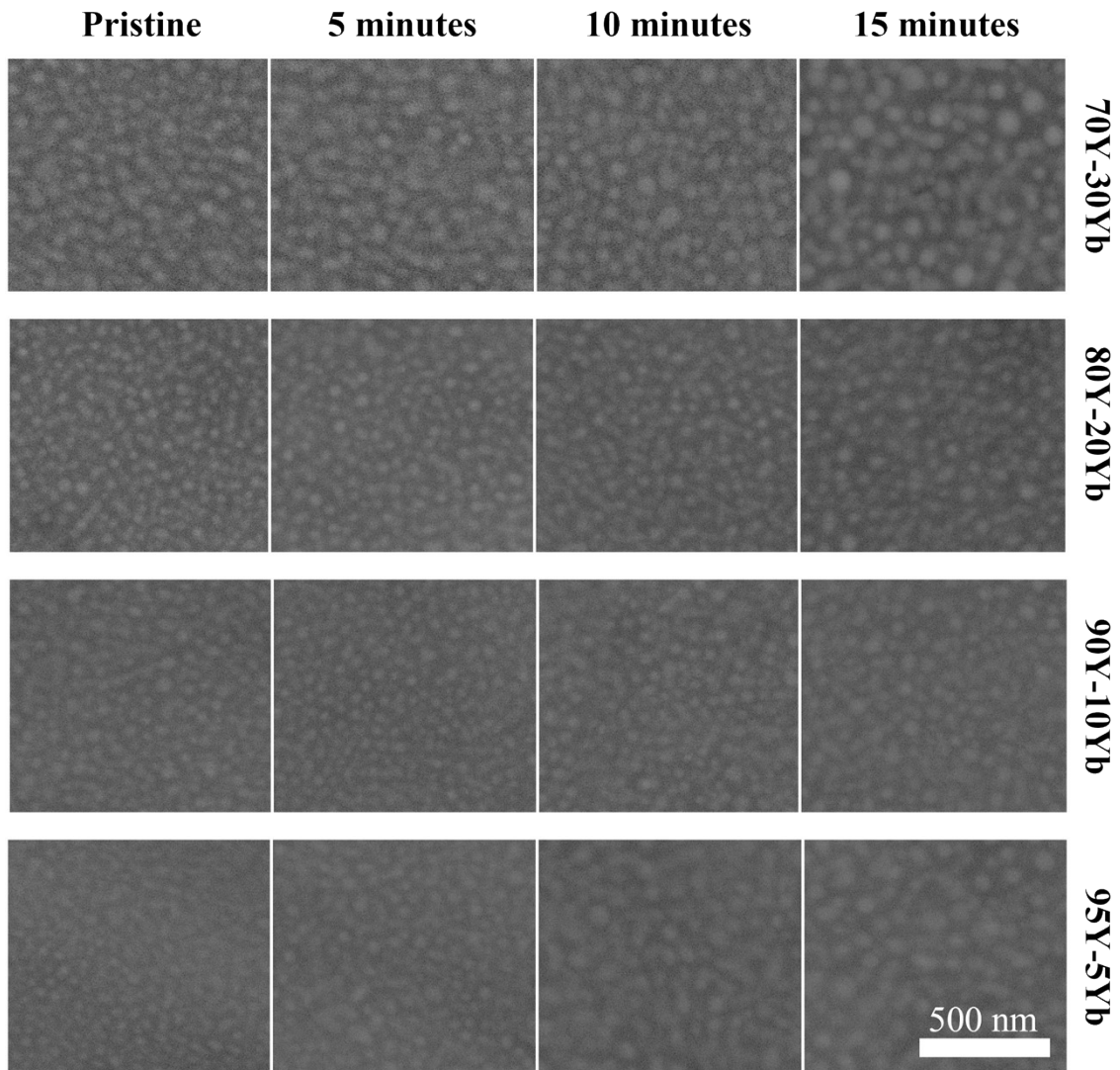


Figure 4. SEM images of sample core of all samples after isothermal treatment at 1400°C for 0, 5, 10 and 15 minutes.

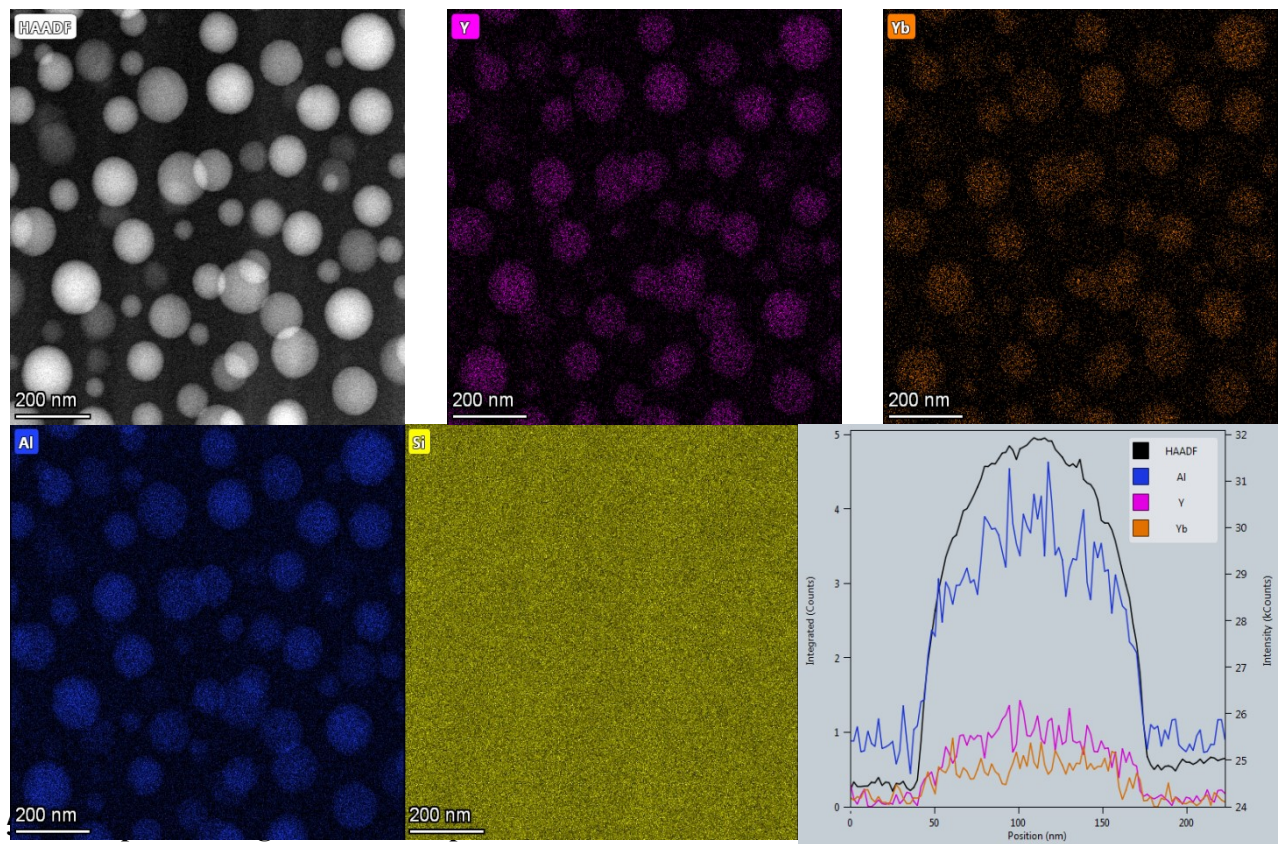
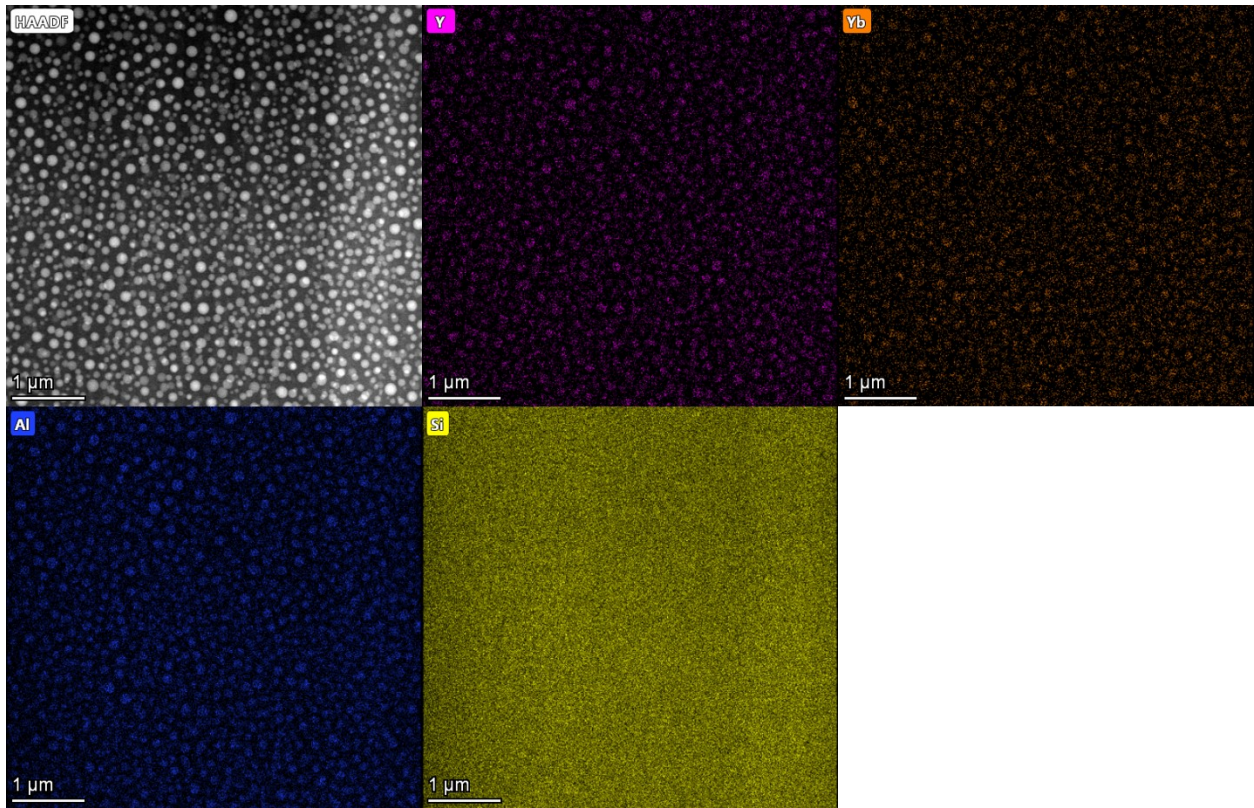


Figure 5. Additional TEM images with different magnification and their respective EDX profile/cartography

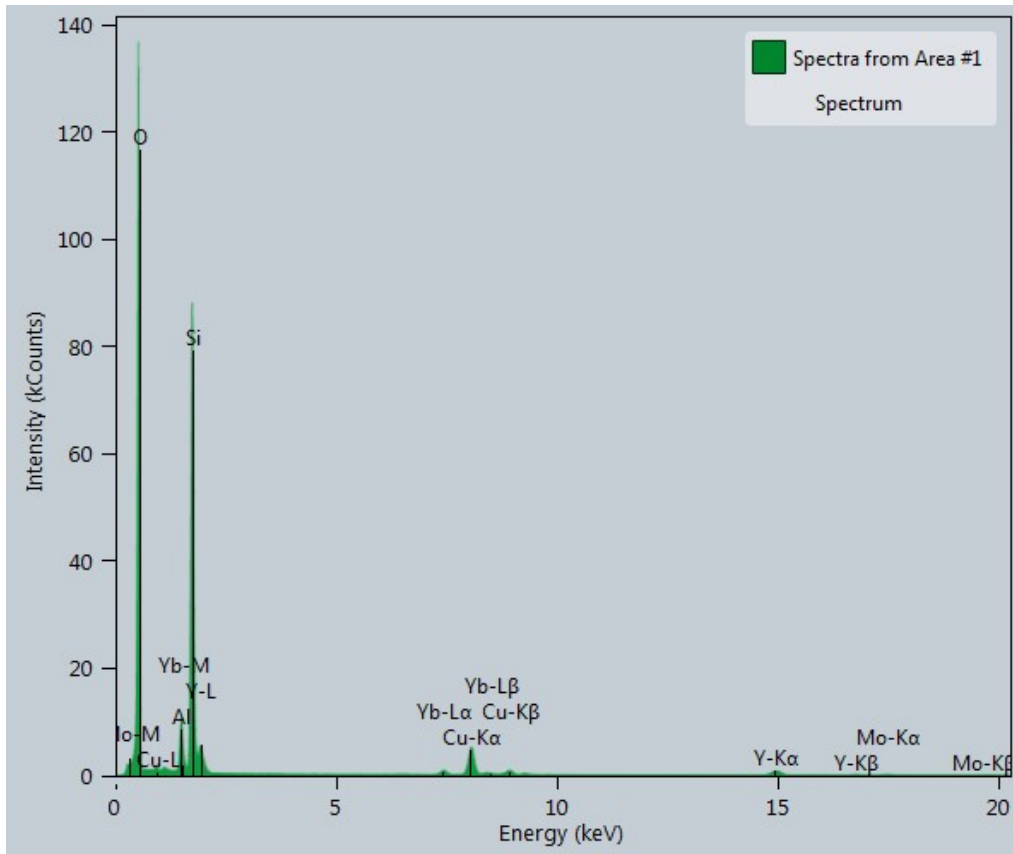


Figure 6. EDX spectra of phase separated regions

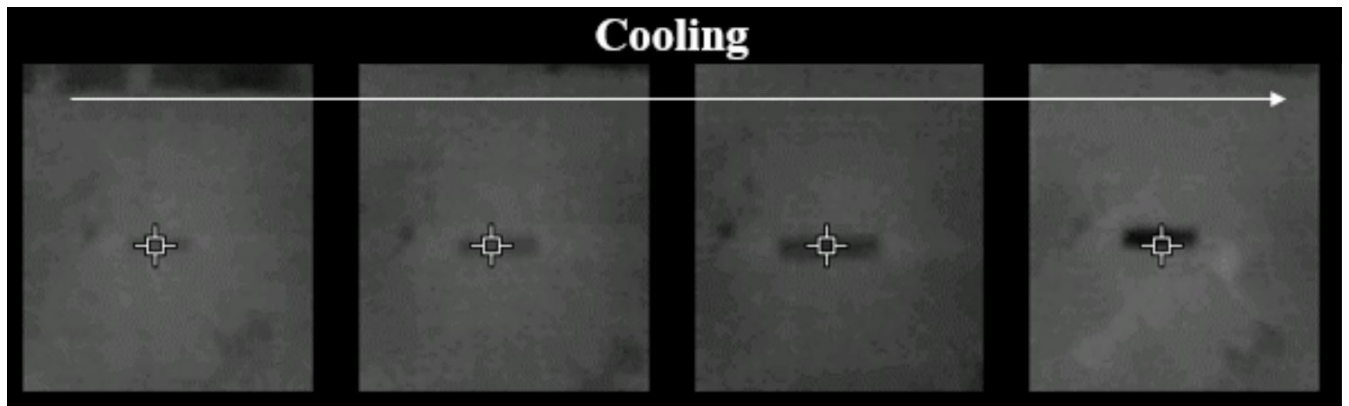


Figure 7. Thermal images of cooling sample (90Y-10Yb) using FLIR camera

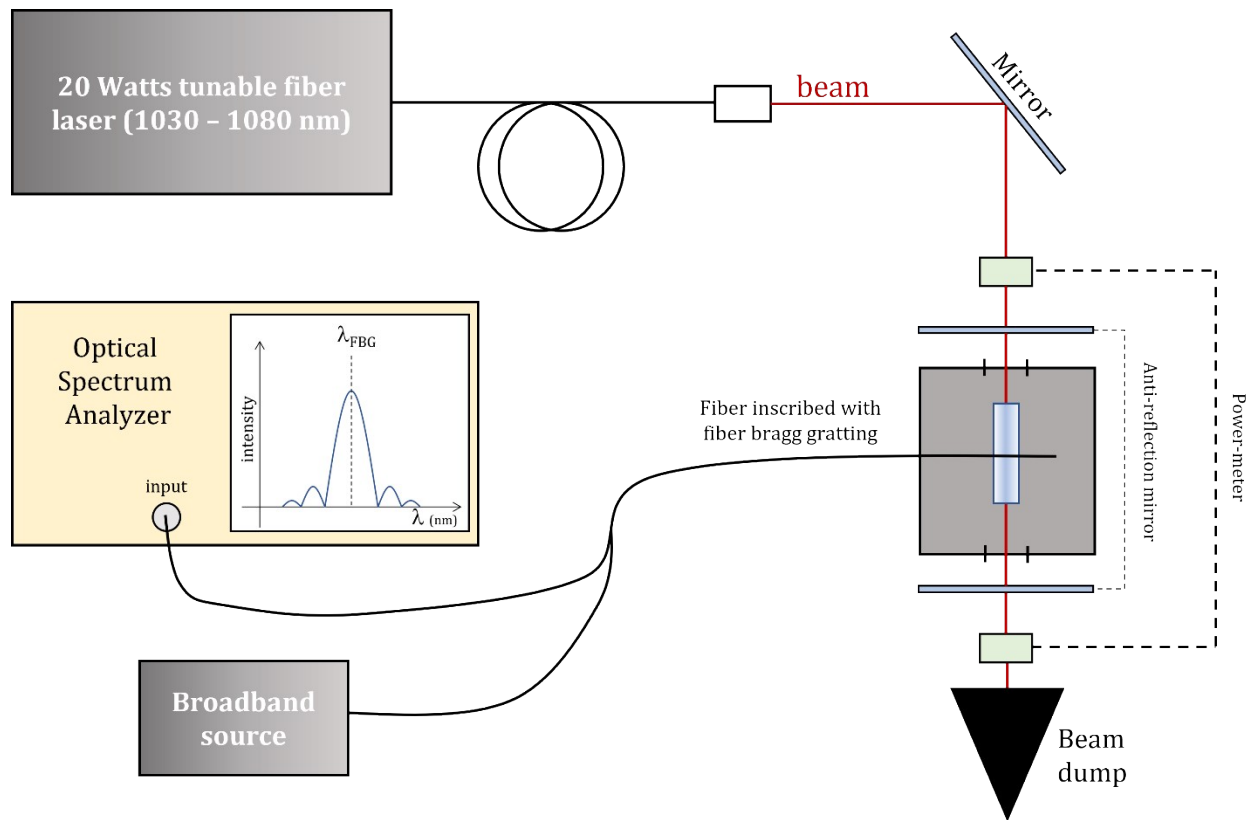


Figure 8. Schematic of optical thermometry setup used for optical refrigeration measurements.