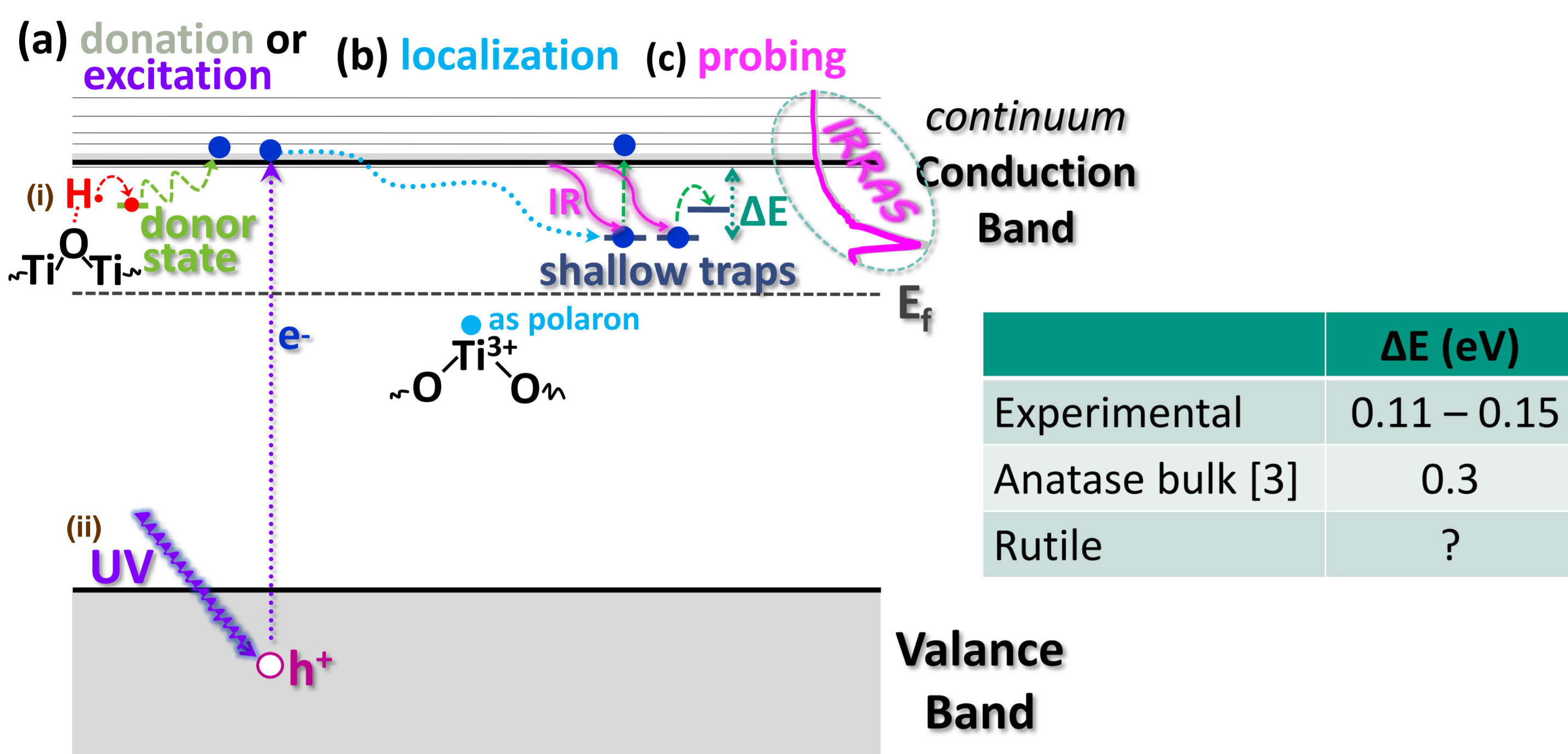


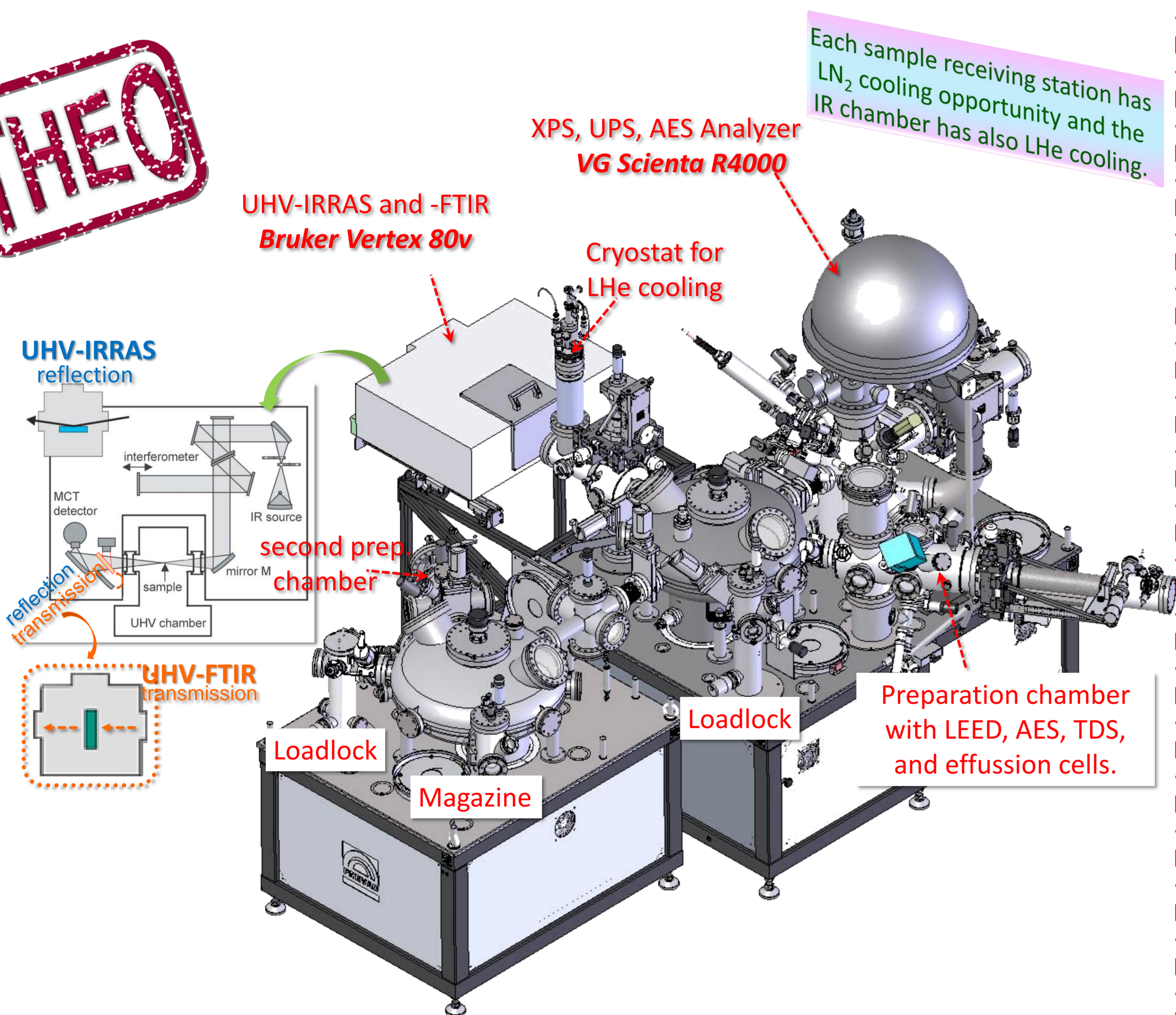
## 1 Scope

Probing trapped shallow state electrons delivering from both atomic hydrogen and UV treatments on powder and single crystal TiO<sub>2</sub> samples by a novel method of the infrared reflection absorption spectroscopy in an ultrahigh vacuum environment (UHV-IRRAS).<sup>[1-2]</sup> However, now we have a more furnished UHV system at KIT, which is called as THEO!



## 2 Instrumental

**THEO**



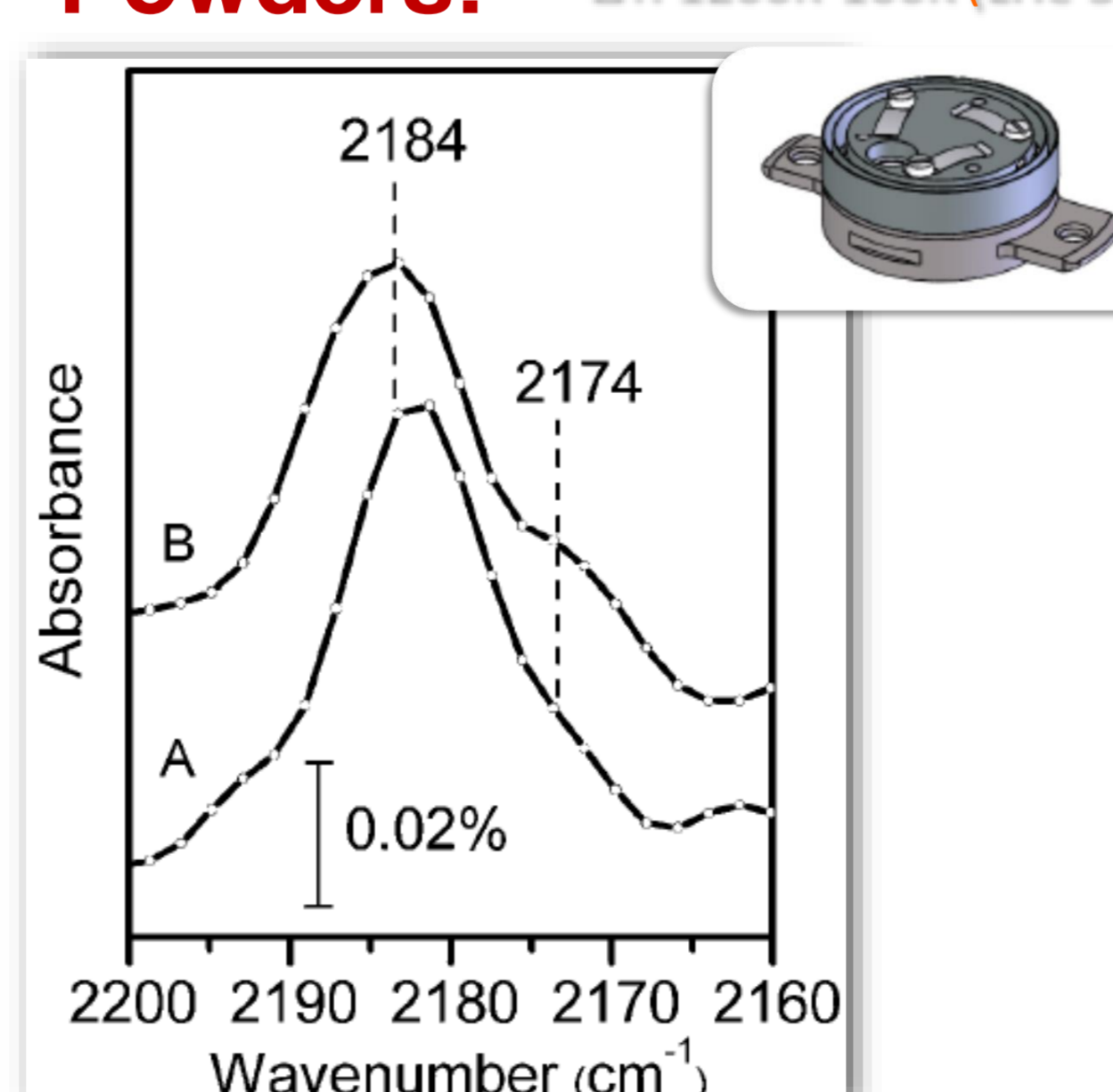
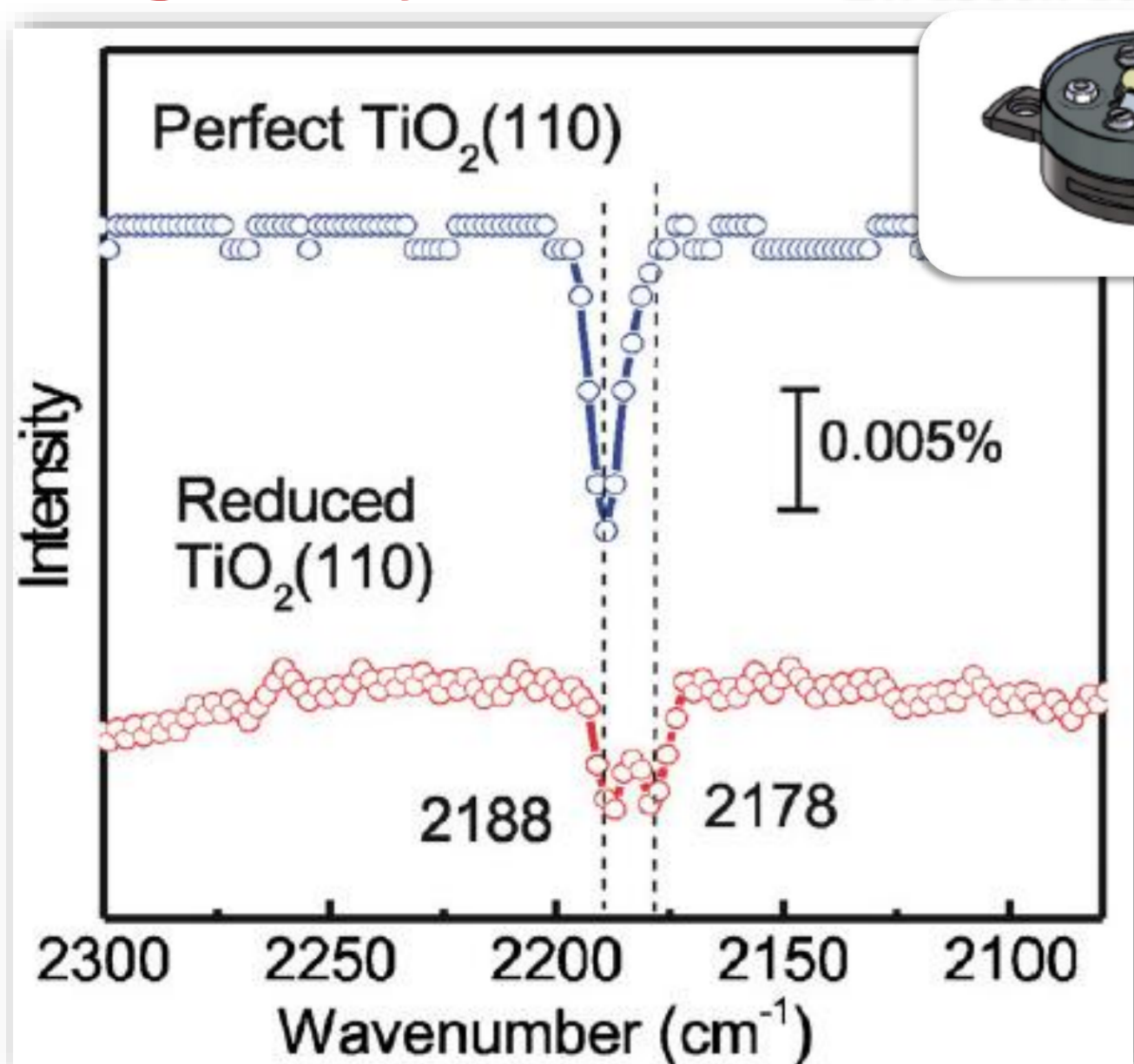
Performance of the system: CO absorption on r-TiO<sub>2</sub><sup>[2]</sup>

Single Crystals:

E-beam sample holder:  
 $\Delta T$ : 1500K-100K (LHe 30K)

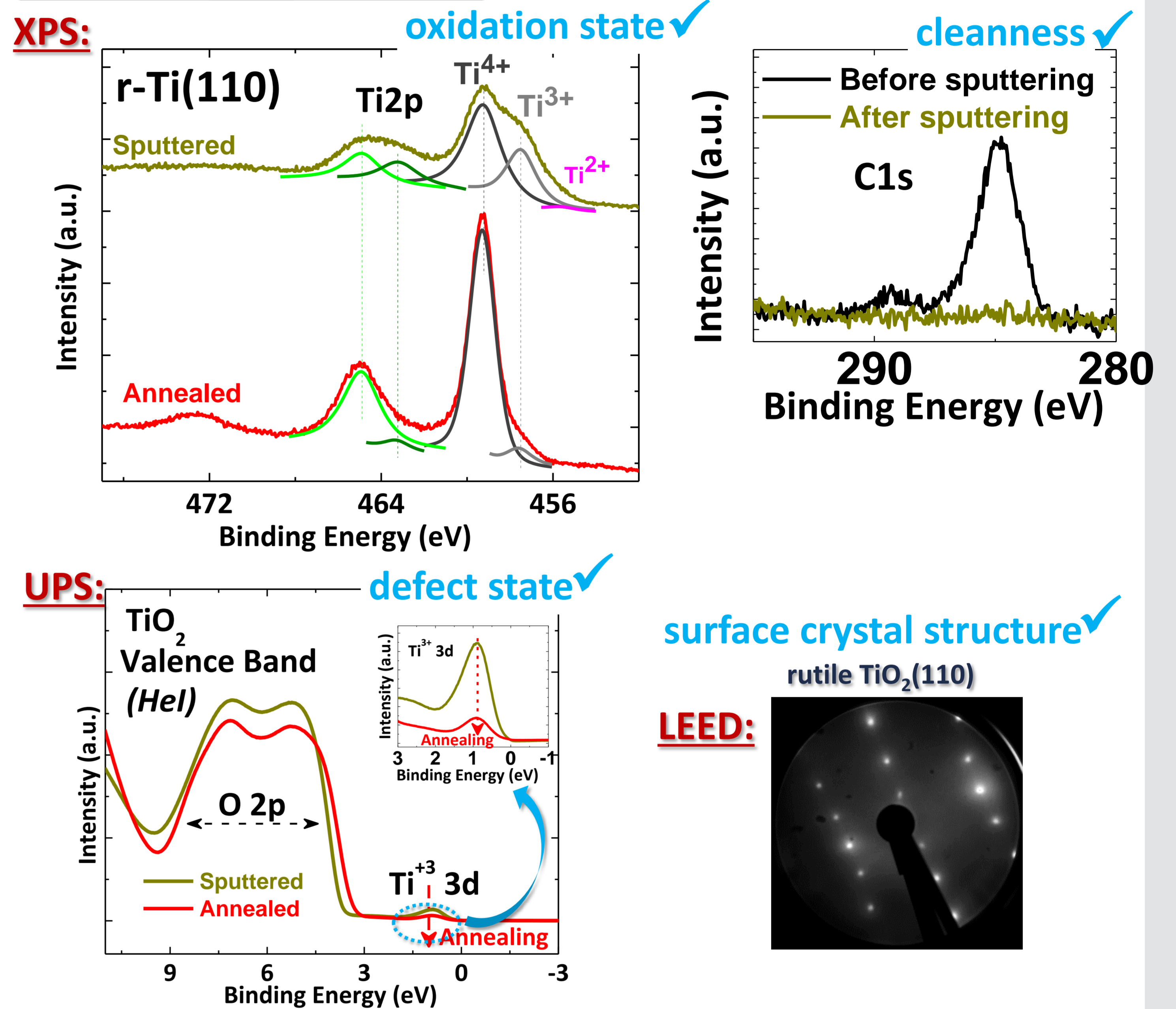
Powders:

Transmission sample holder:  
 $\Delta T$ : 1200K-100K (LHe 30K)



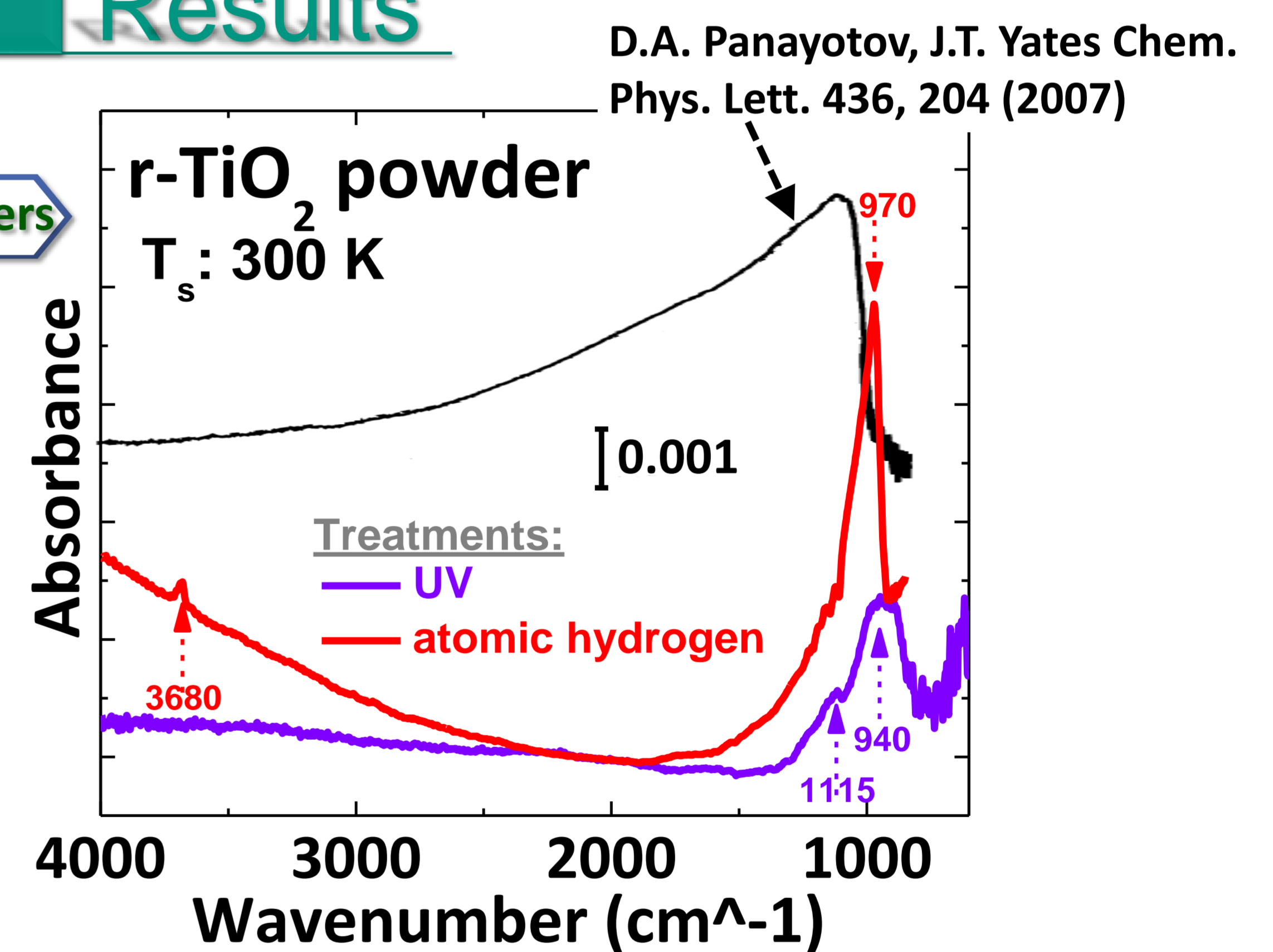
## 3 Experiment

Sample Preparation: >

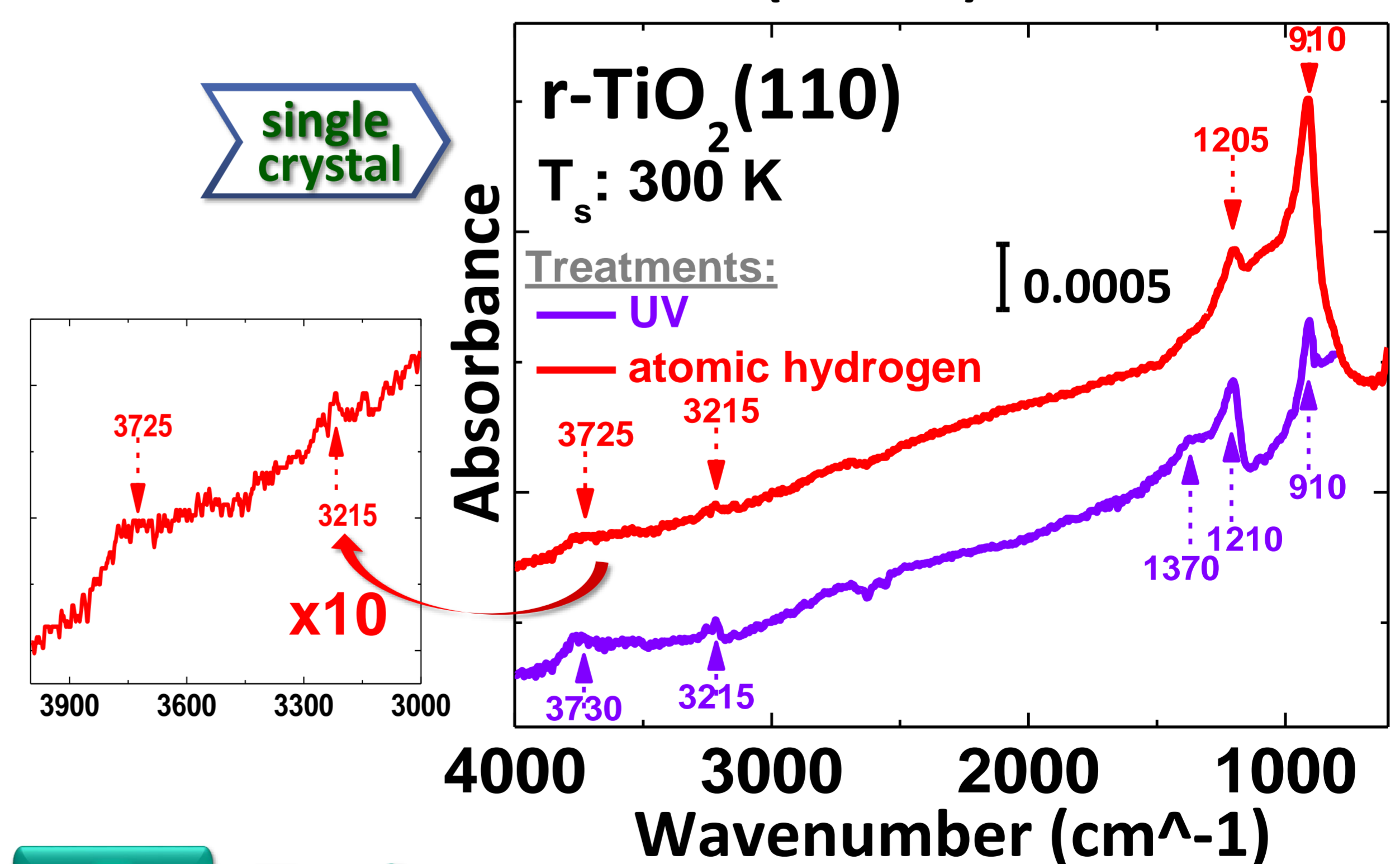


## 4 Results

powders



single crystal



## 5 References

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- 5.) D. A. Panayotov and J. T. Yates Jr, Che. Phys. Lett. 436, 204 (2007).
- 6.) D. A. Panayotov, S. P. Burrows, J. R. Morris, J. Phys. Chem. C 116, 4535 (2012).