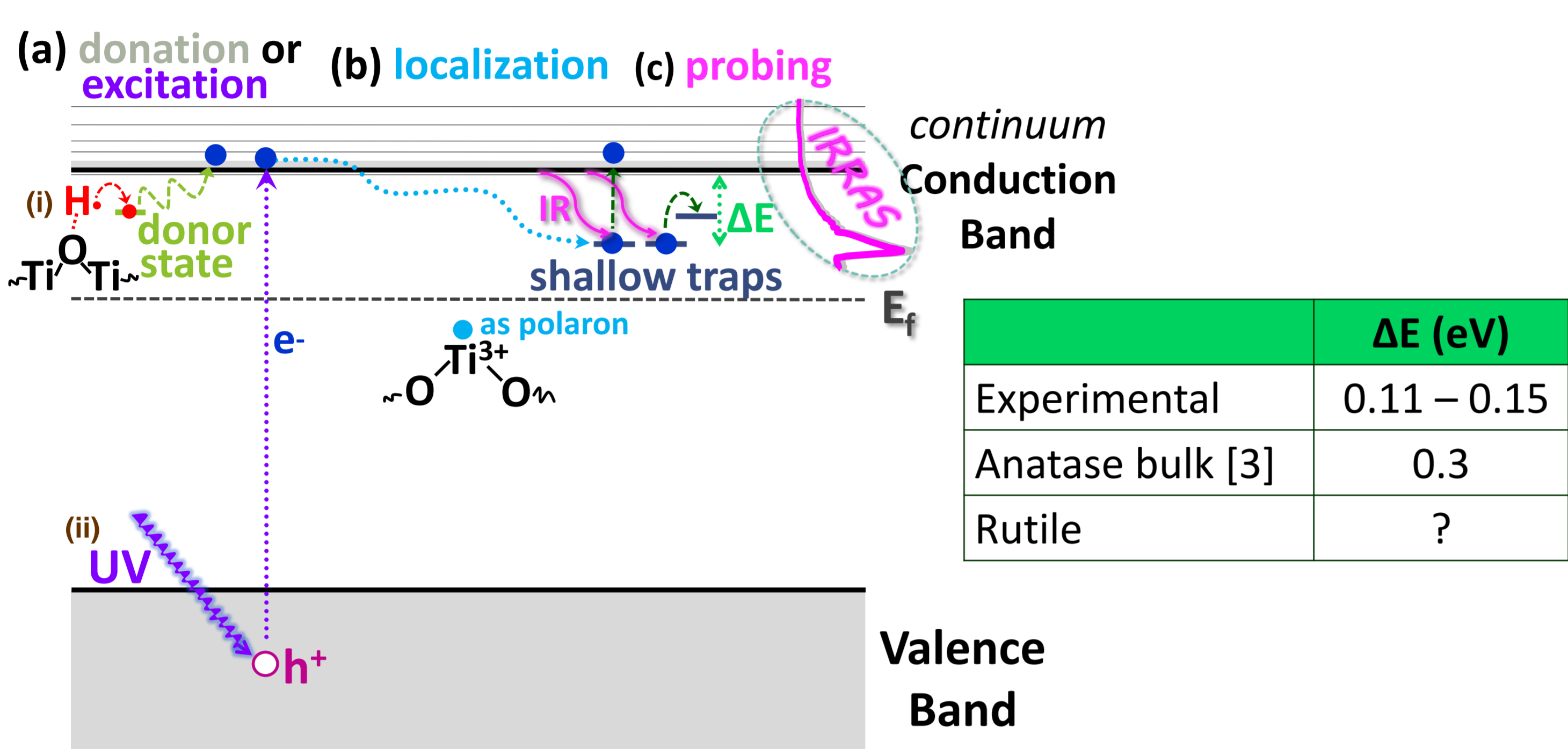


Probing Shallow Trapped Electrons of TiO₂ with UHV-IRRAS

Hikmet Sezen, Maria Buchholz, Carsten Natzeck, Alexei Nefedov,
Stefan Heissler, Cristiana Di Valentin, Christof Wöll

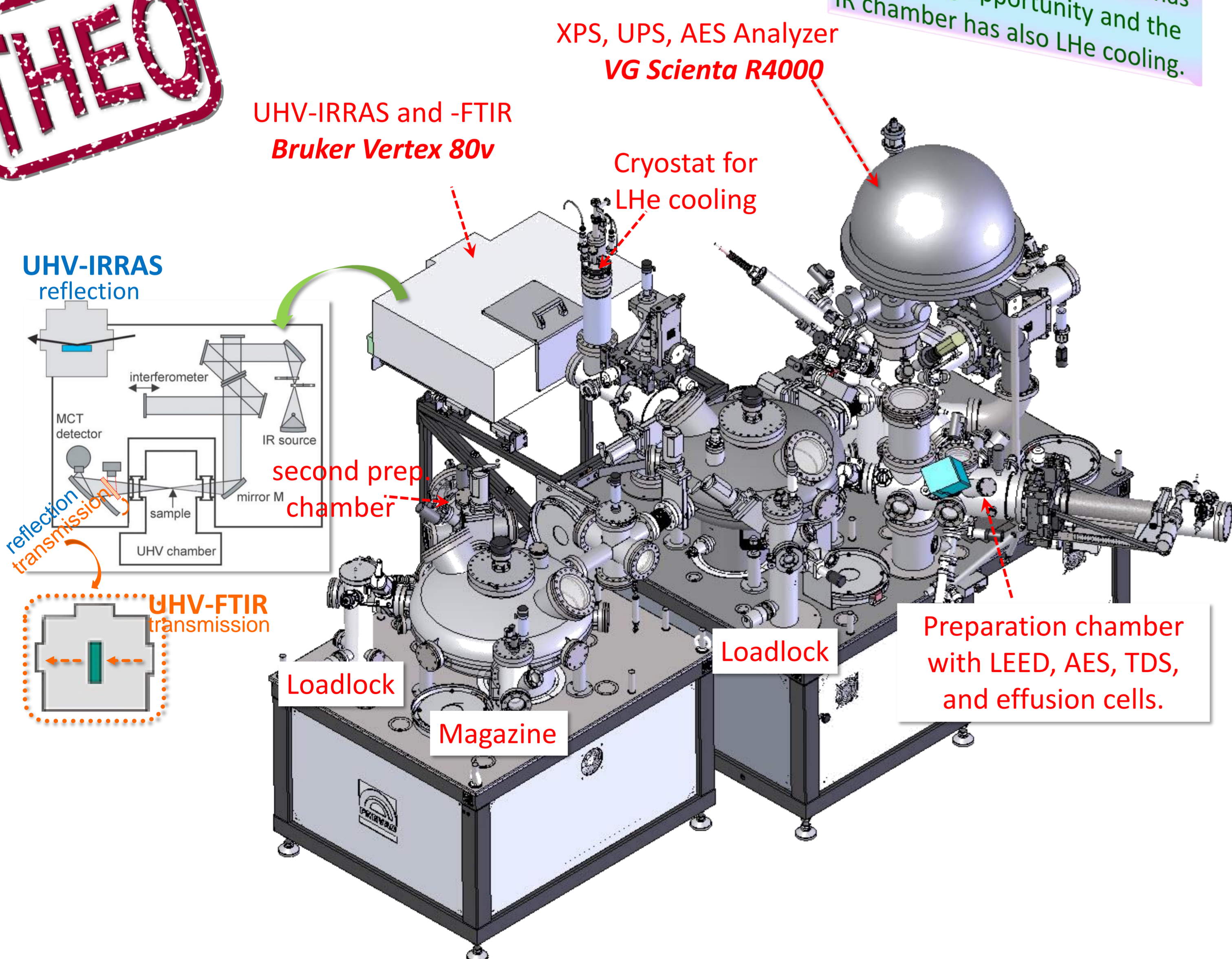
1 Scope

Probing trapped shallow state electrons loaded from both atomic hydrogen and UV treatments on powder and single crystal TiO₂ samples by a novel method of the infrared reflection absorption spectroscopy in an ultrahigh vacuum environment (UHV-IRRAS).^[1-2] However, now we have a more furnished UHV system at KIT, which is called THEO!



2 Instrumental

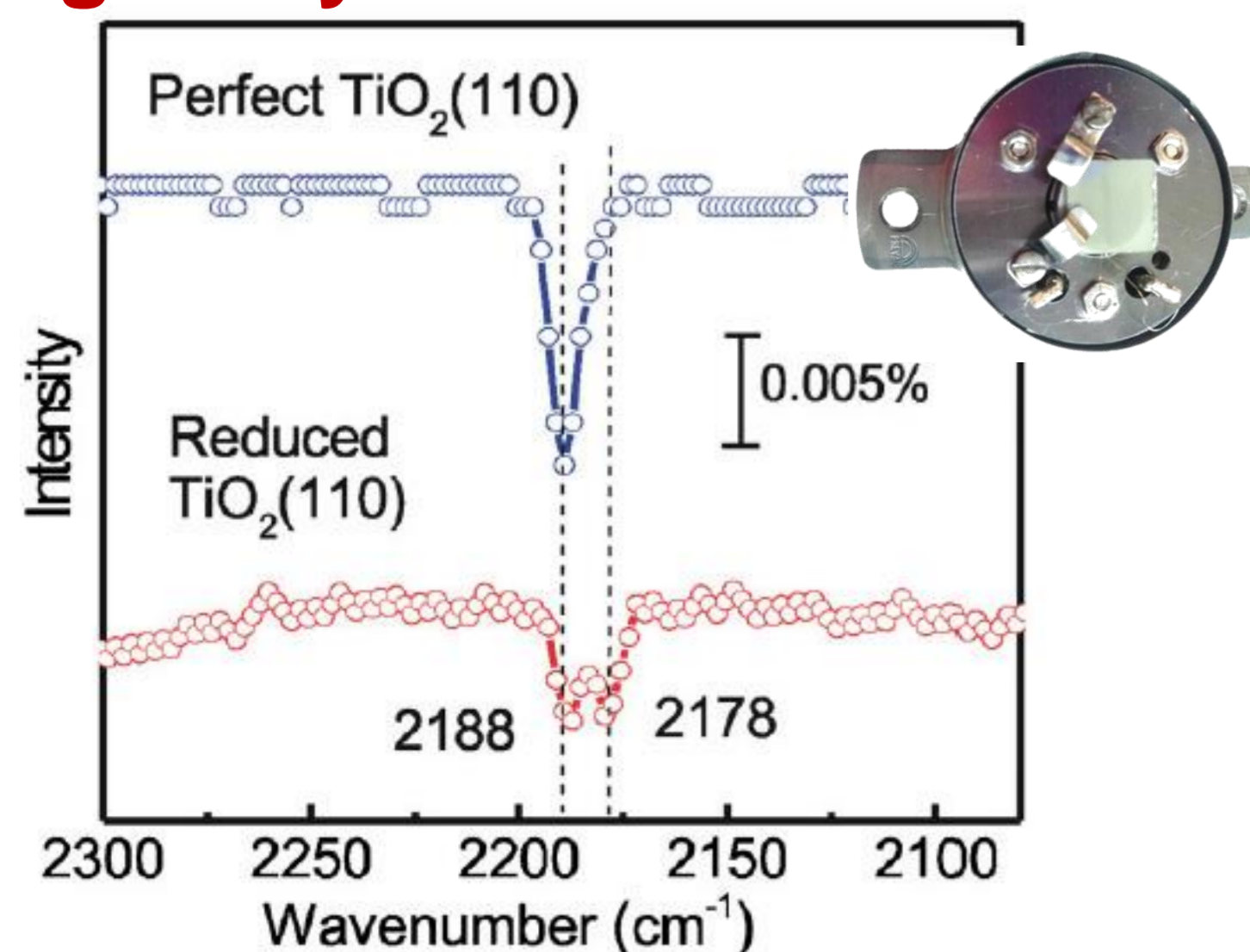
THEO



Performance of the system: CO adsorption on r-TiO₂^[2]

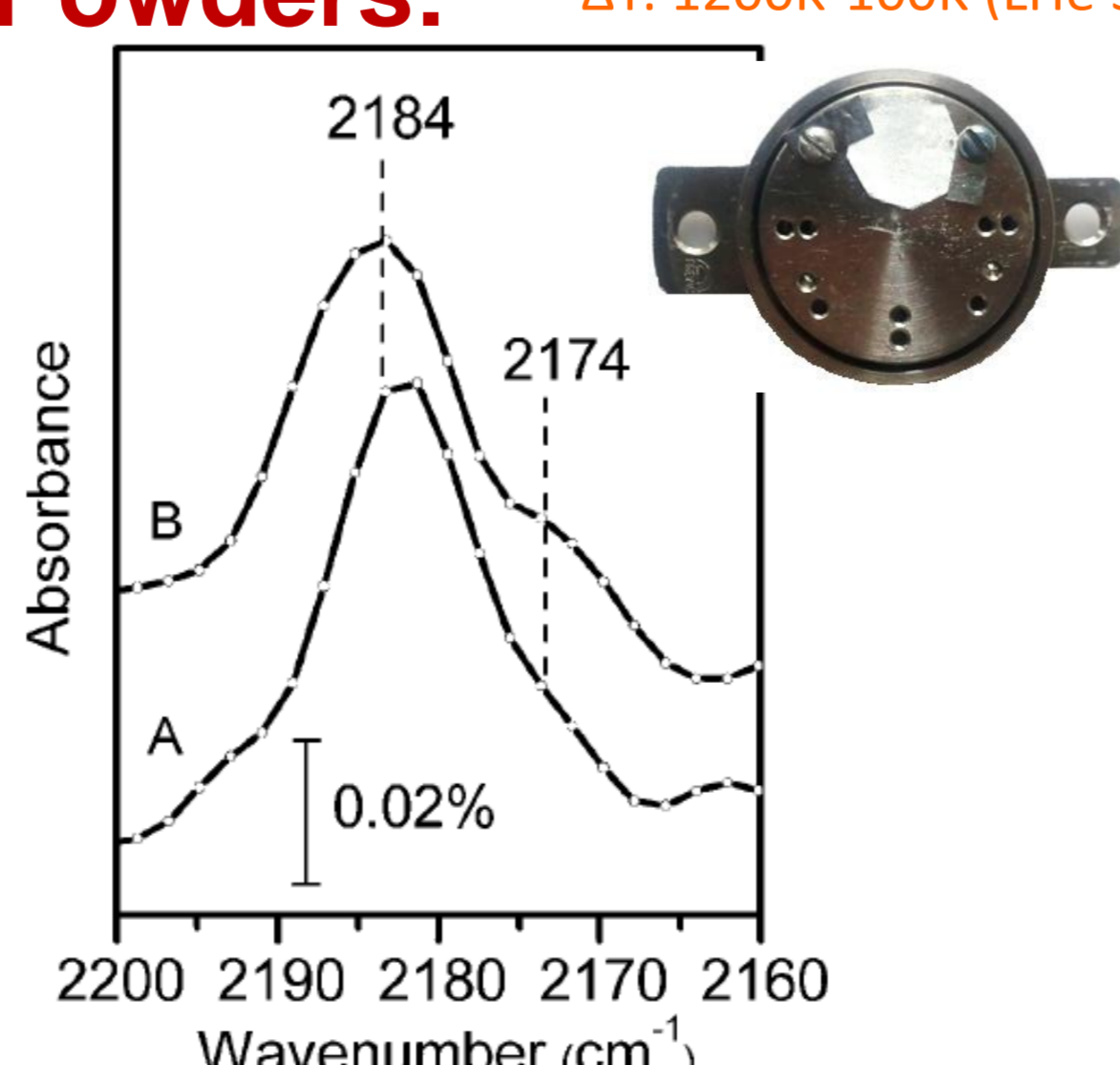
Single Crystals:

E-beam sample holder:
ΔT: 1500K-100K (LHe 30K)

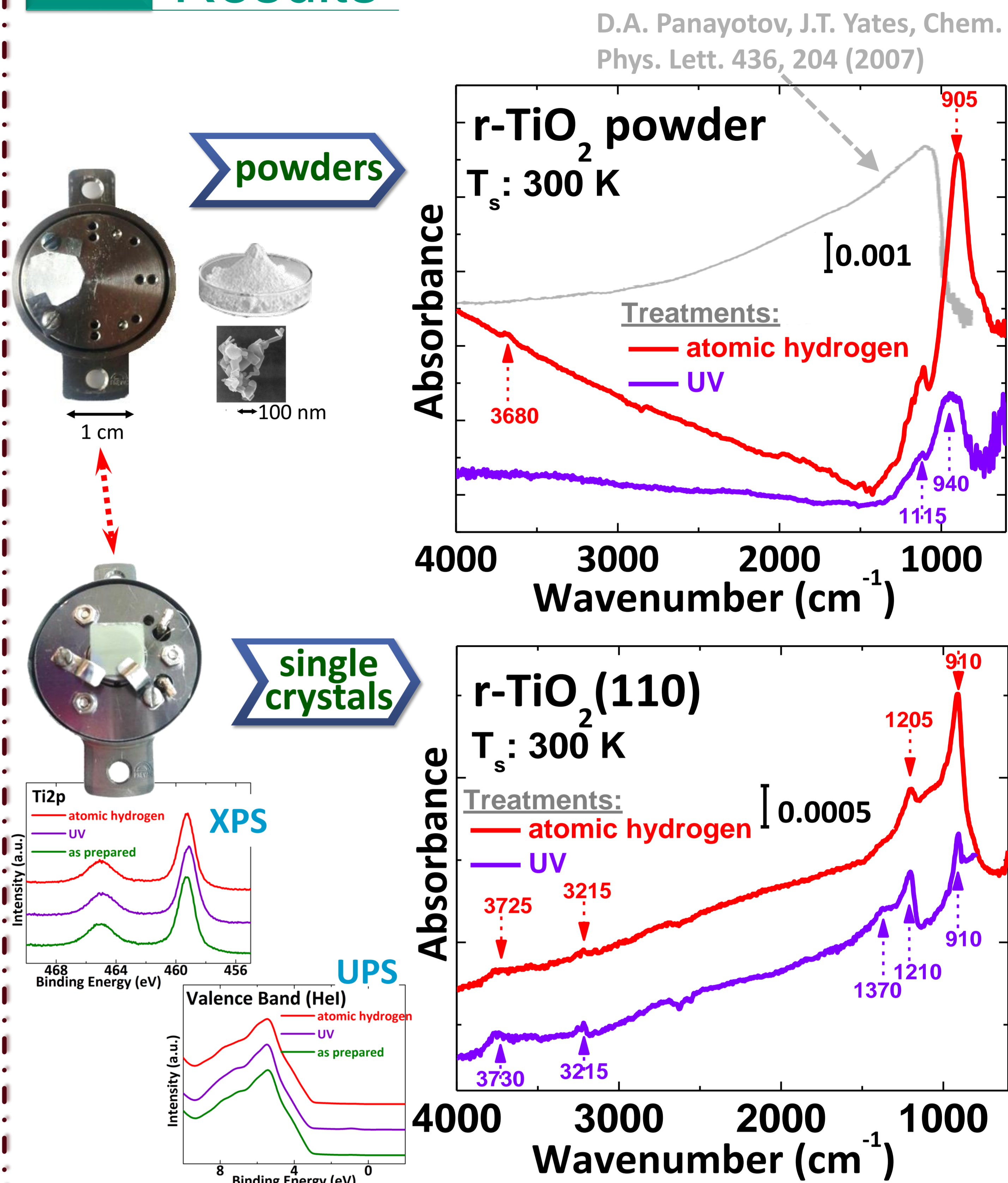


Powders:

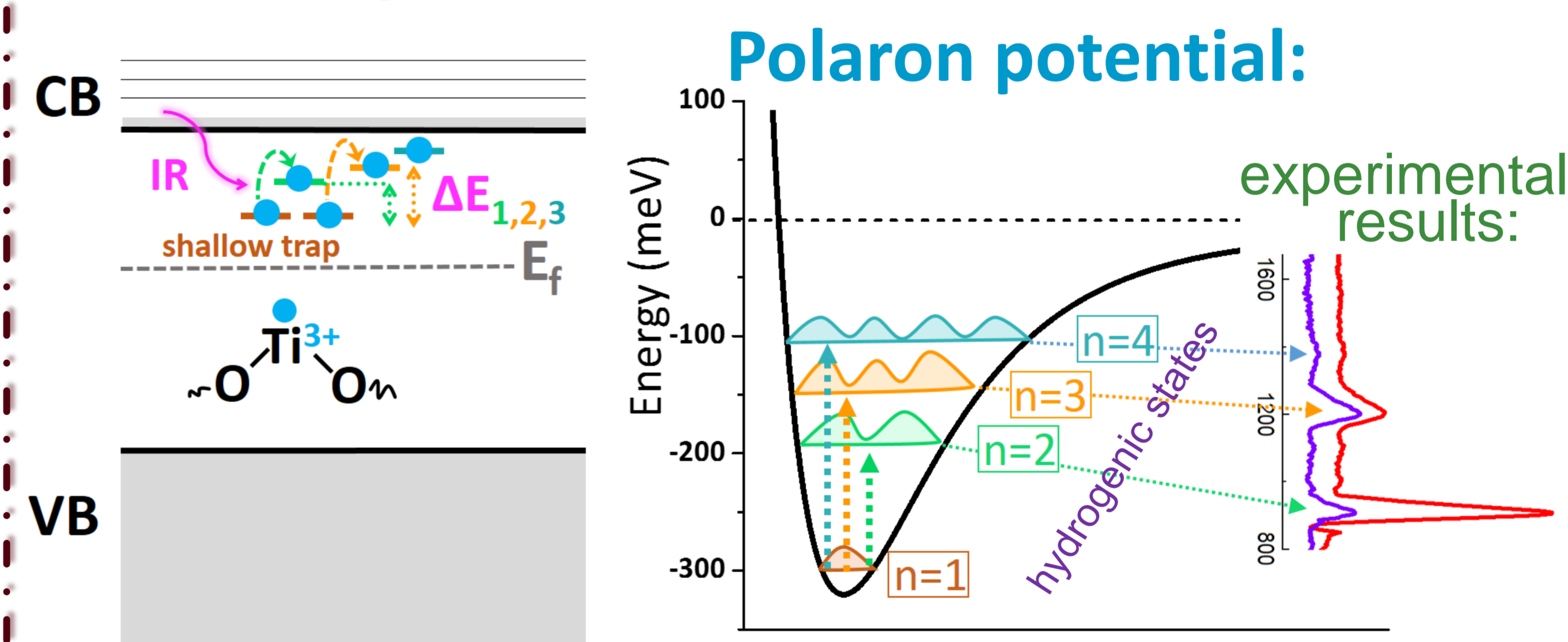
Transmission sample holder:
ΔT: 1200K-100K (LHe 30K)



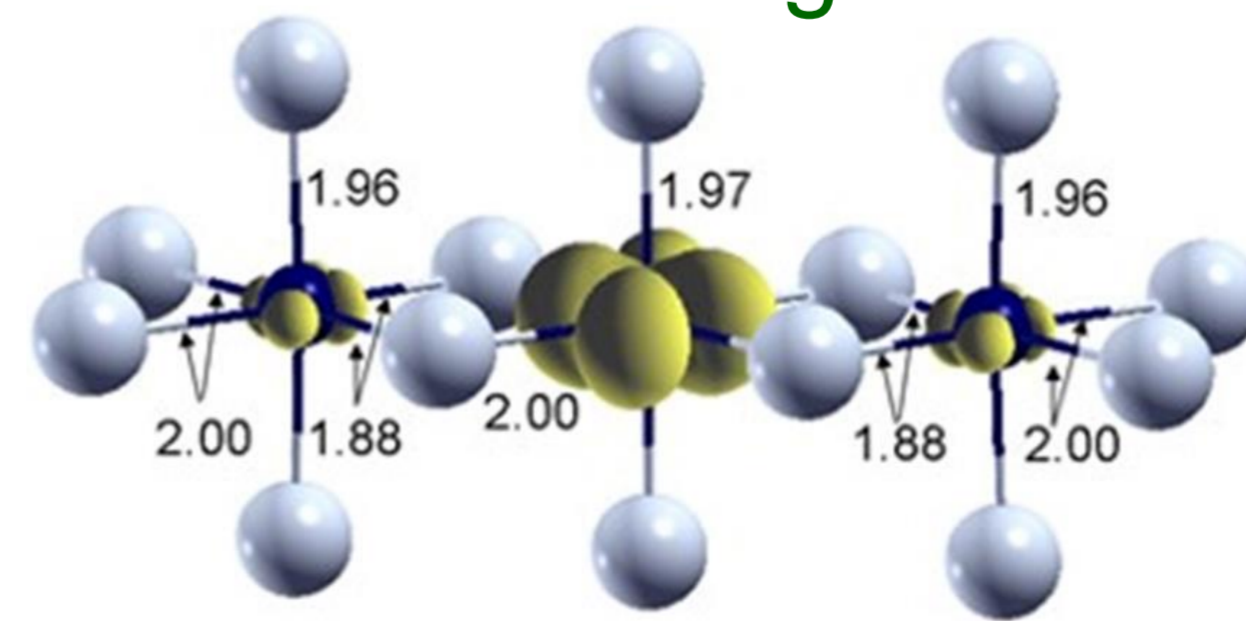
3 Results*



4 Explanation*



theoretical findings → intrinsic defect state



*accepted for publication
in Scientific Reports

5 References

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