

# “Fingerprint”: a method for quick quality control of catalysts for heterogeneous hydrogenation



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## Background & Overview of the Project

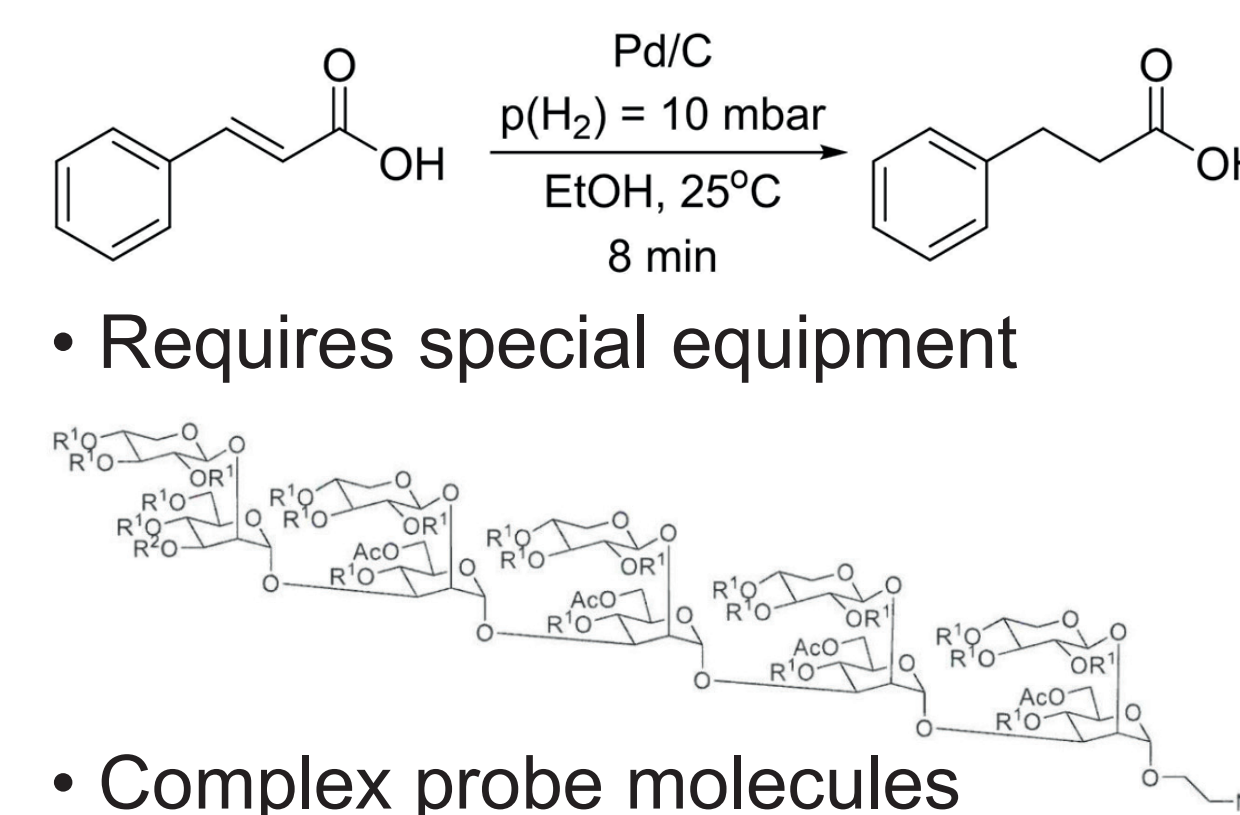
Catalyst characterization **by physical methods** (TEM, SEM, XRD N<sub>2</sub> adsorption, CO chemisorption etc.)...

- High equipment cost
- Takes a lot of time
- Many samples
- **No guarantee of reproducible results in hydrogenation reactions**

VS

**Quality control (QC)** based on chemical behavior of catalyst in reaction with probe molecule

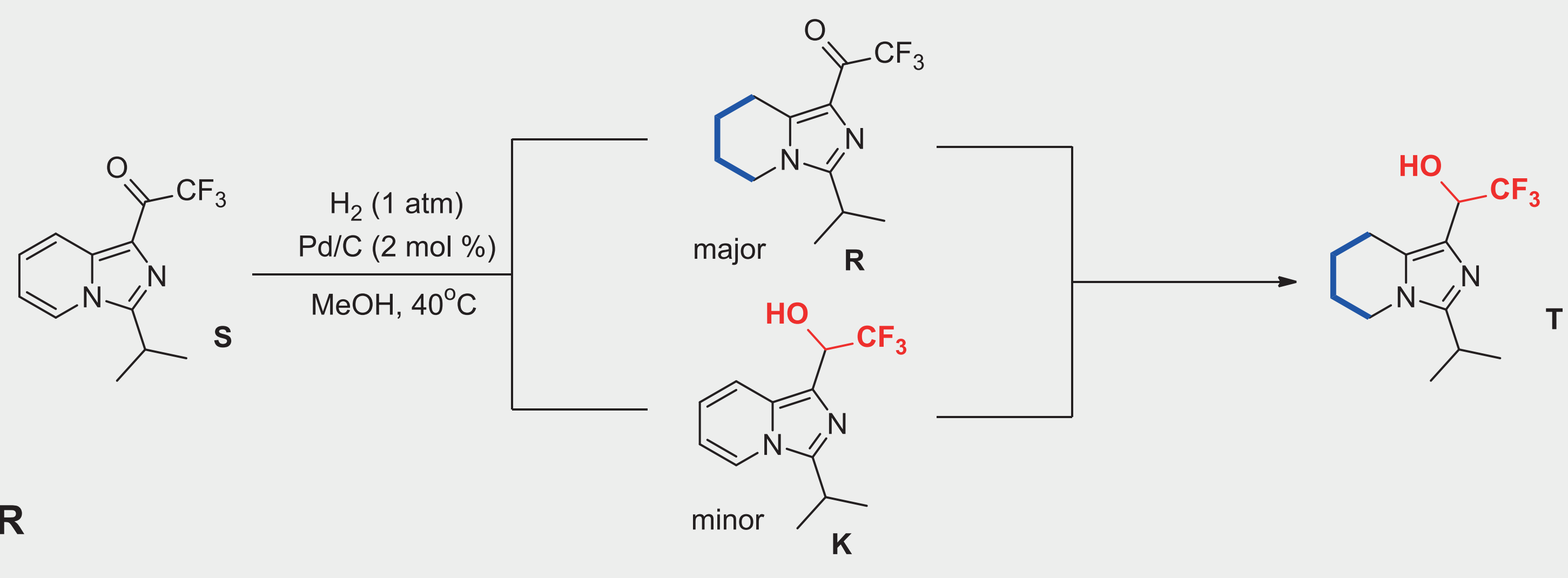
- **Quick analysis**
- **One sample**



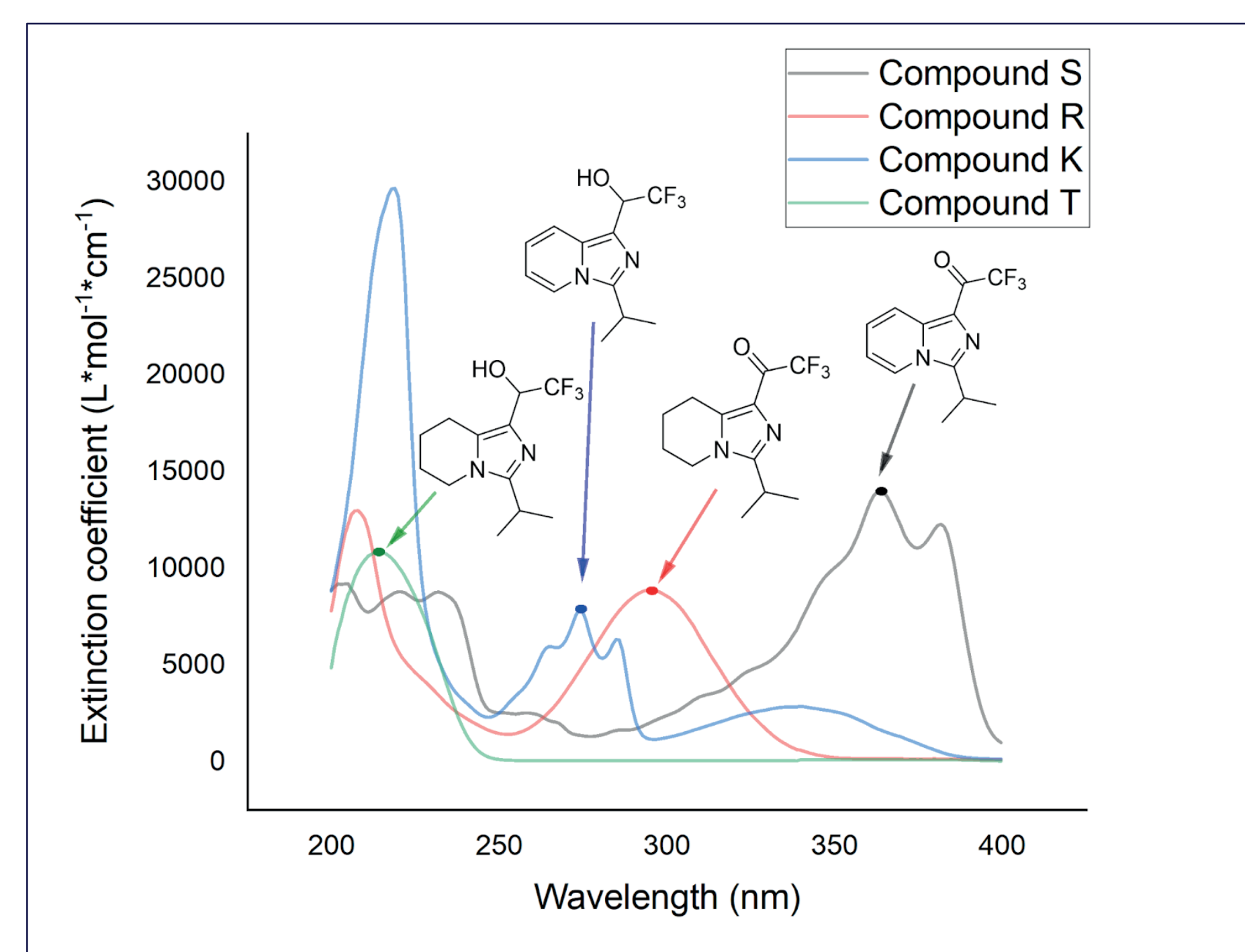
## THIS WORK

**Quick QC** of catalysts for heterogeneous hydrogenation

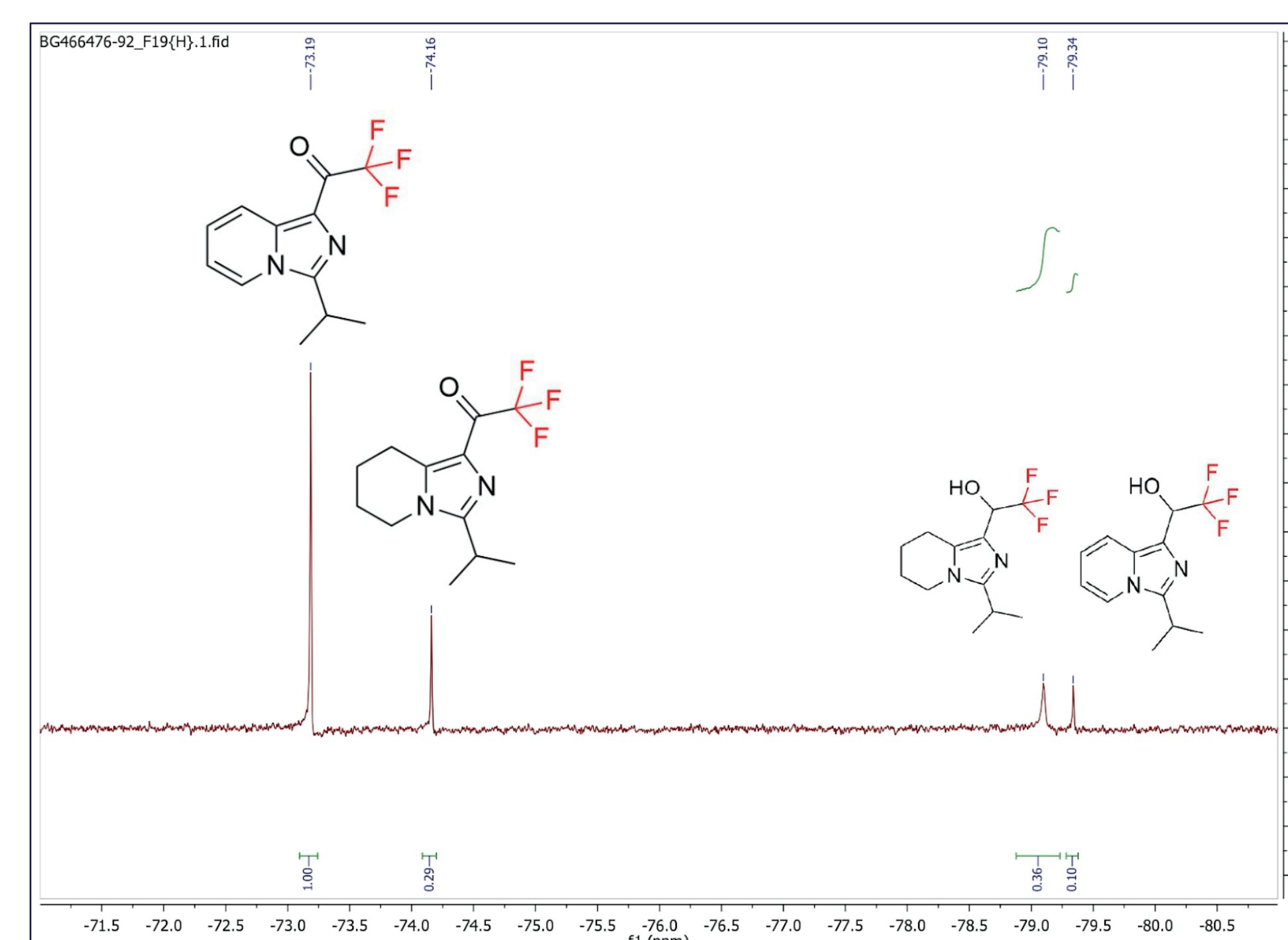
- Simple probe molecule
- Common lab equipment
- Mild reaction conditions
- Small experiment time
- Analysis by **UV-vis** or **NMR**



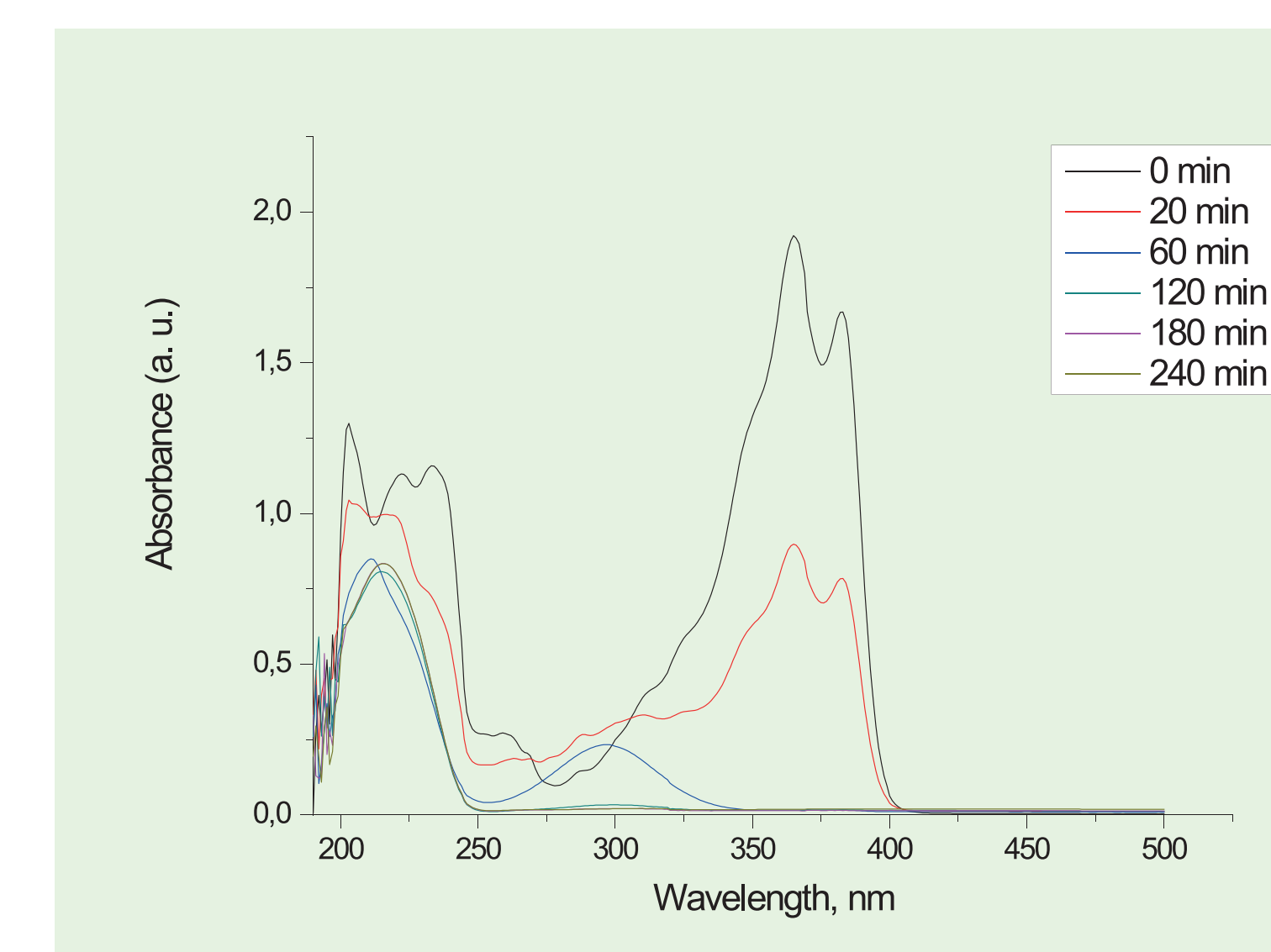
## UV-vis spectra of compounds



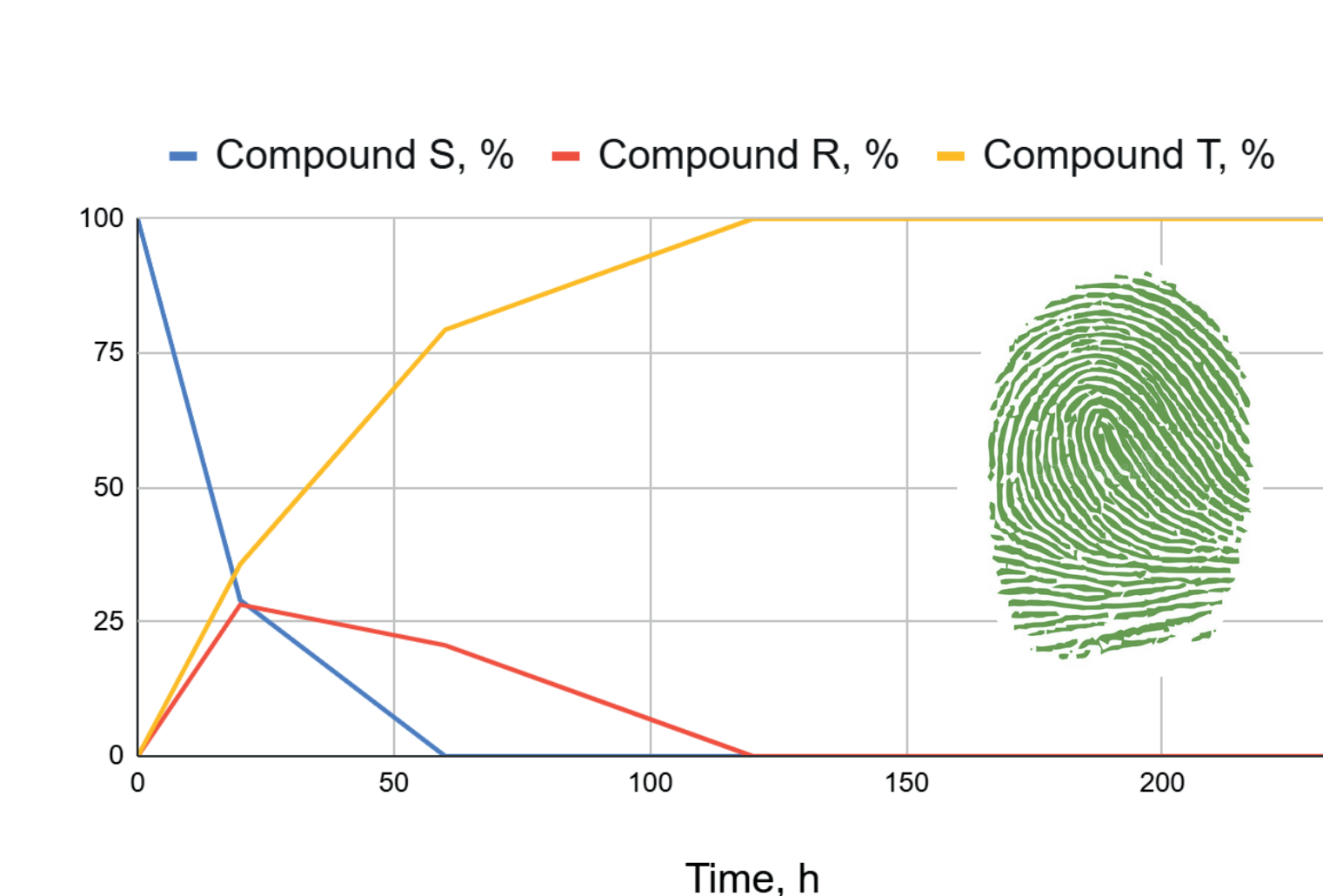
## <sup>19</sup>F NMR spectra of compounds



## “Fingerprint” by UV-vis

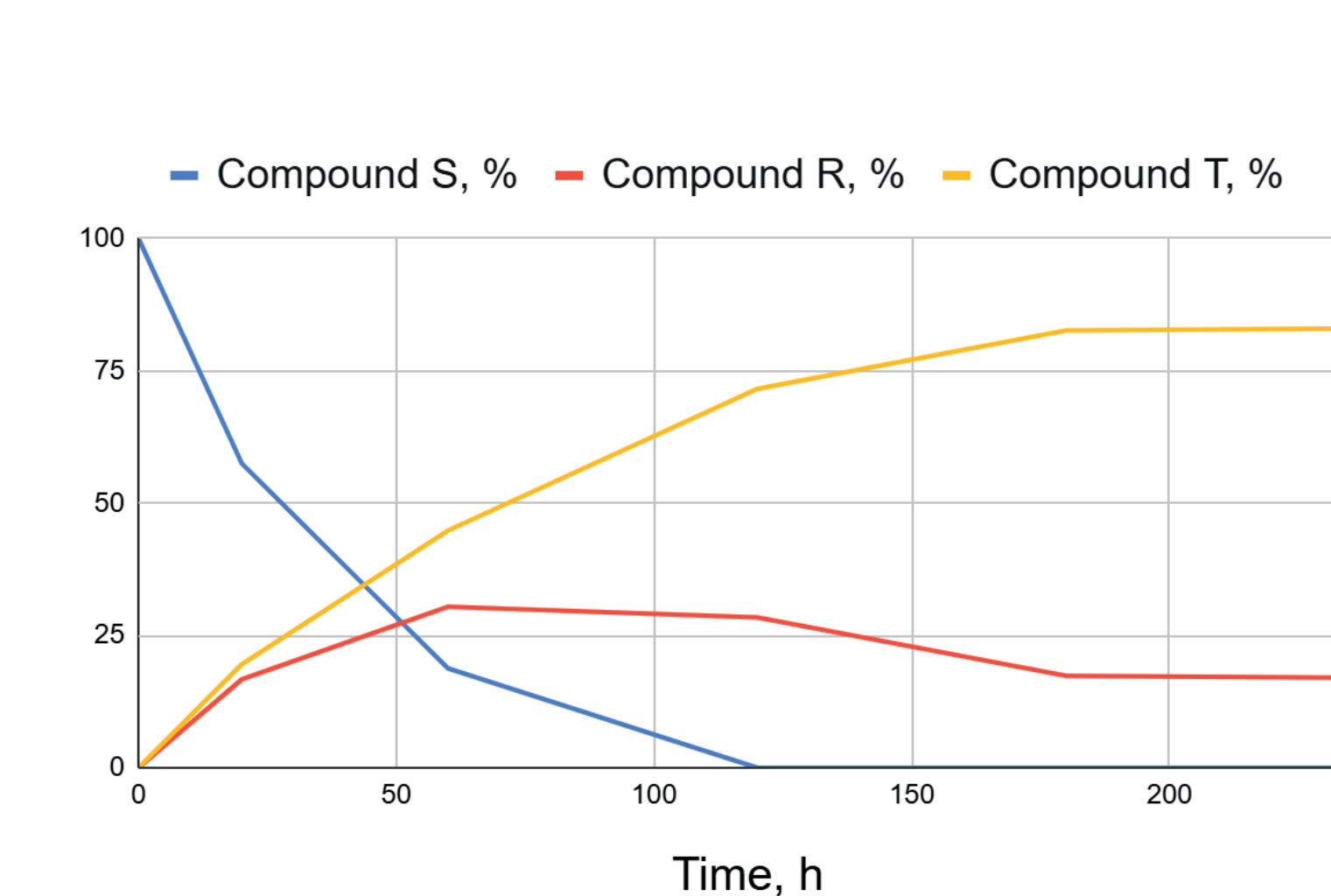
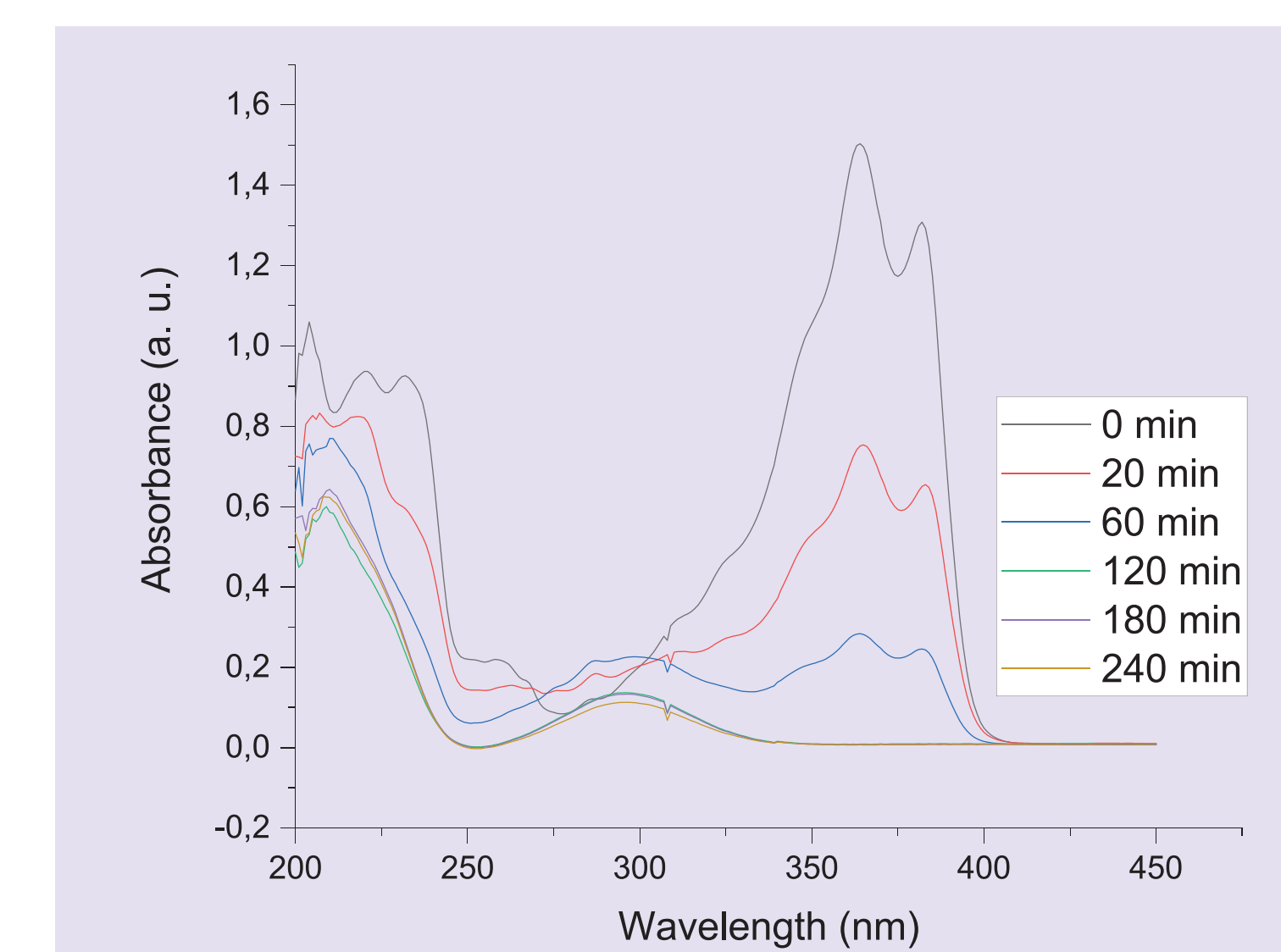


## “Fingerprint” by <sup>19</sup>F NM



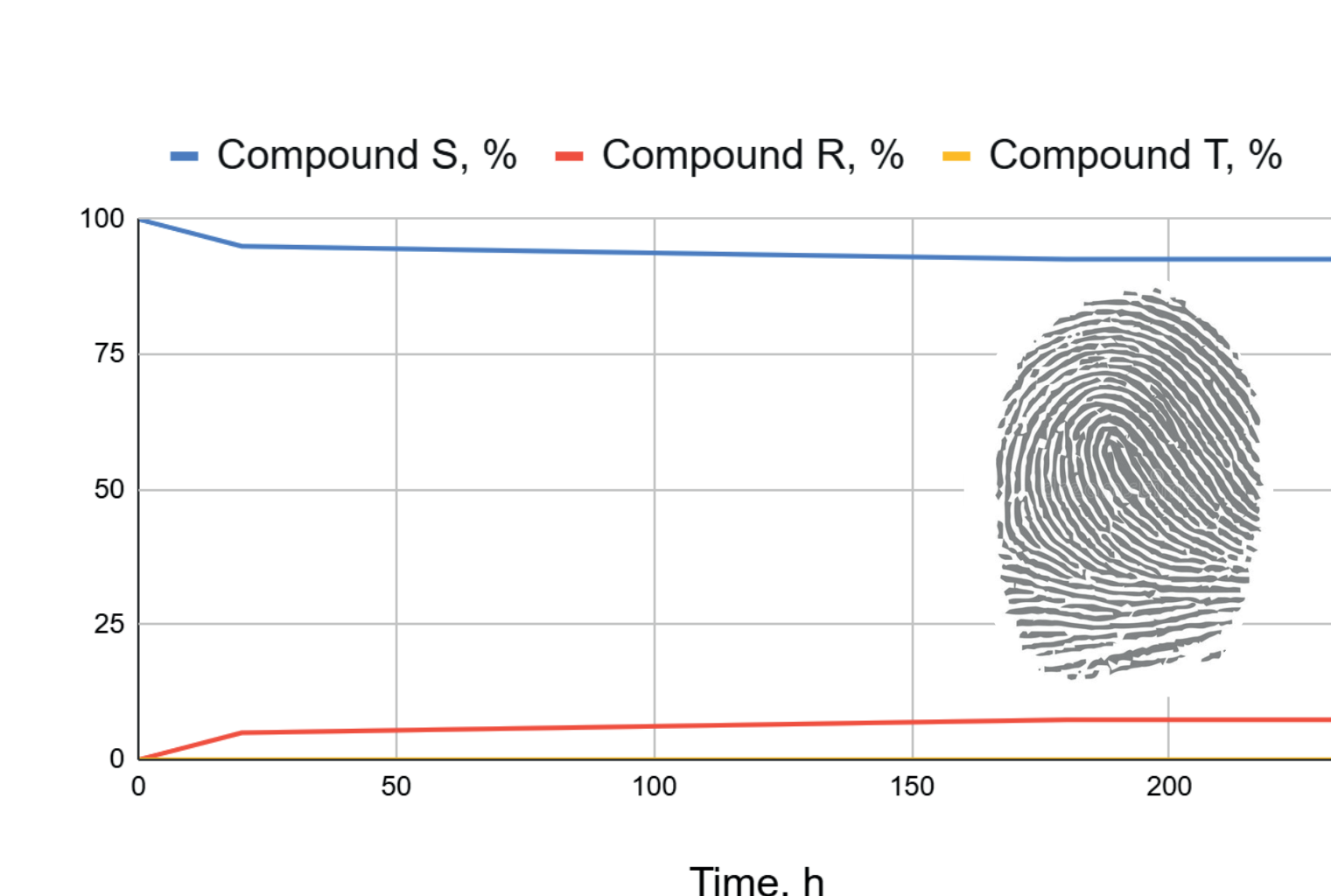
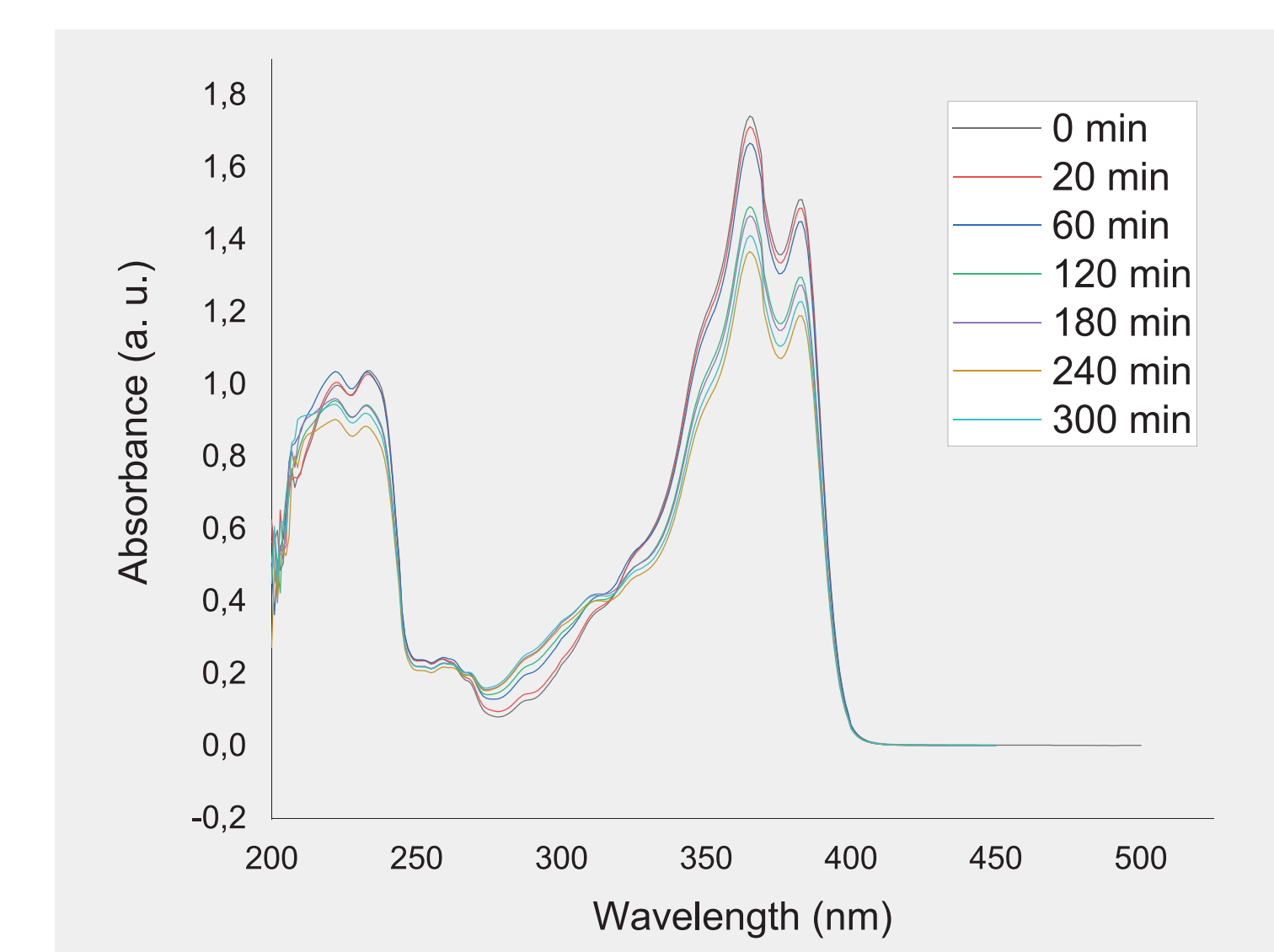
**HIGHLY ACTIVE CATALYST**

- Full conversion of **S** in 1 h
- Only **T** in reaction mixture after 4 h



**MODERATELY ACTIVE CATALYST**

- Full conversion of **S** in 4 h
- Mixture of **T** and **R** after 4 h



**INACTIVE CATALYST**

- Low conversion of **S** after 4 h

## Contact

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