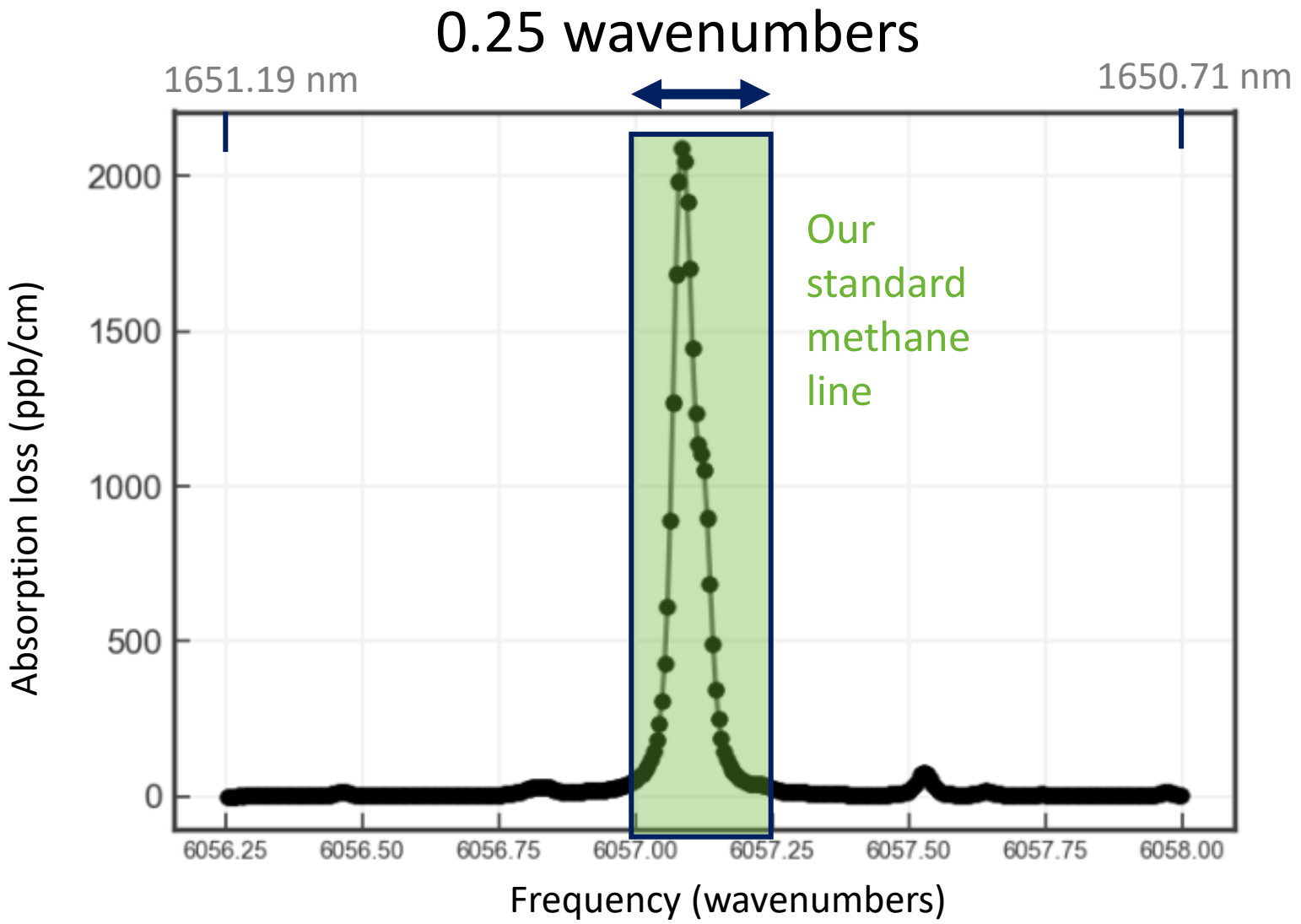

PICARRO
AMMONIA
SUMMIT
20-21 March 2024 - Aarhus, Denmark
PICARRO

CRDS for VOCs

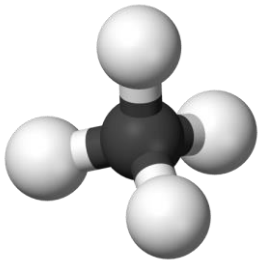
Joel Avrunin

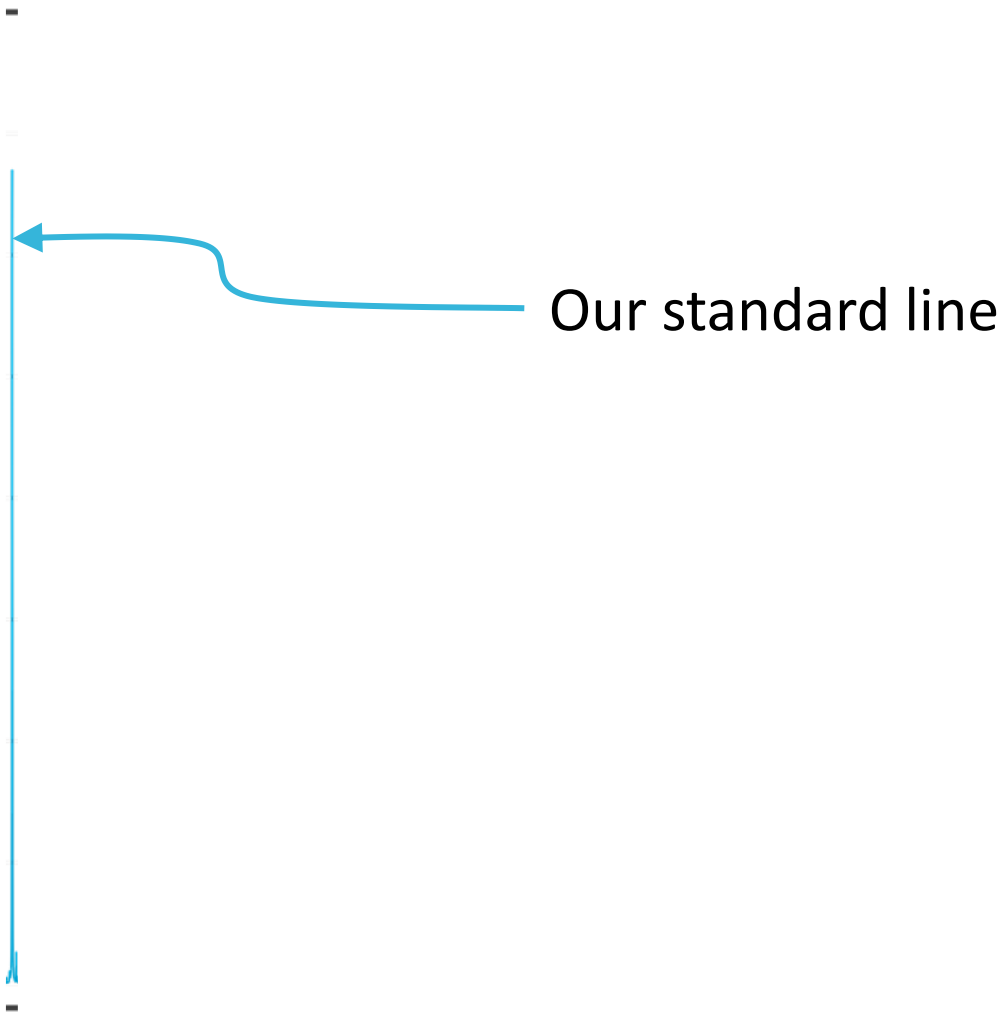
VP, Environmental

CRDS Today: Narrowband Spectroscopy



CRDS Tomorrow: Broadband Spectroscopy





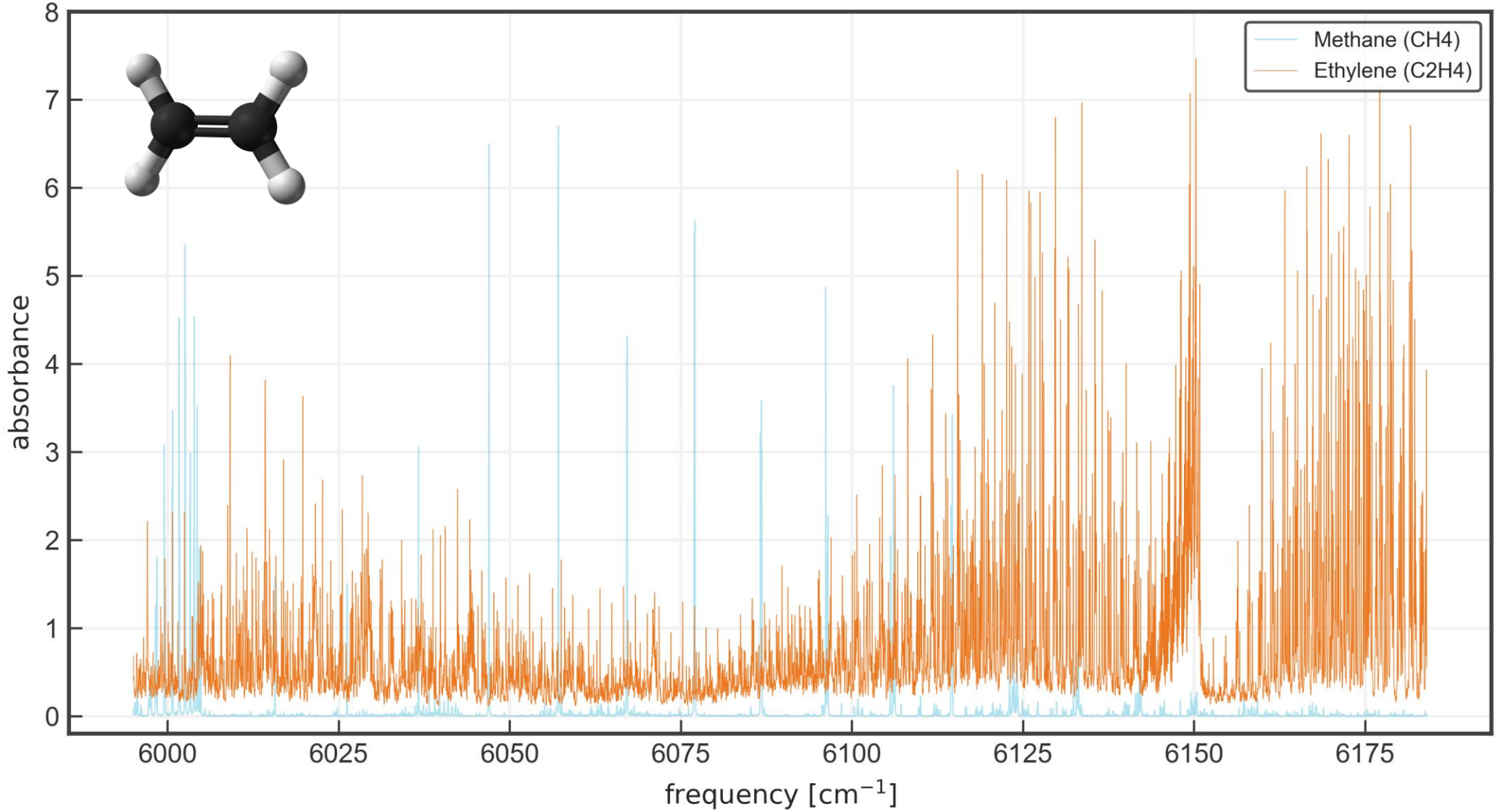
Can You Identify the City Skyline?

New York ? | London ?

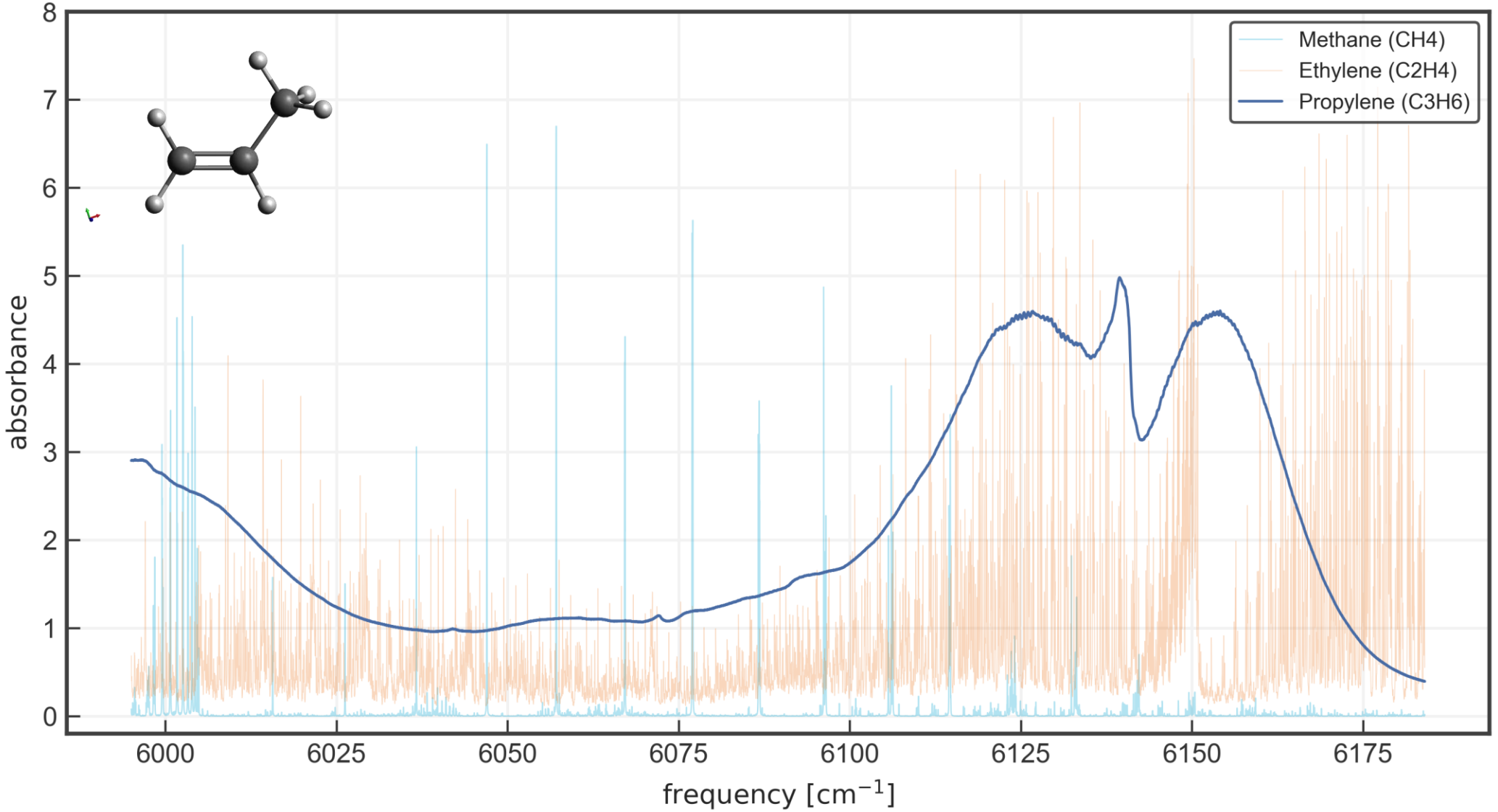
London ? | New York ?

Broadband spectroscopy is THE KEY to VOC detection

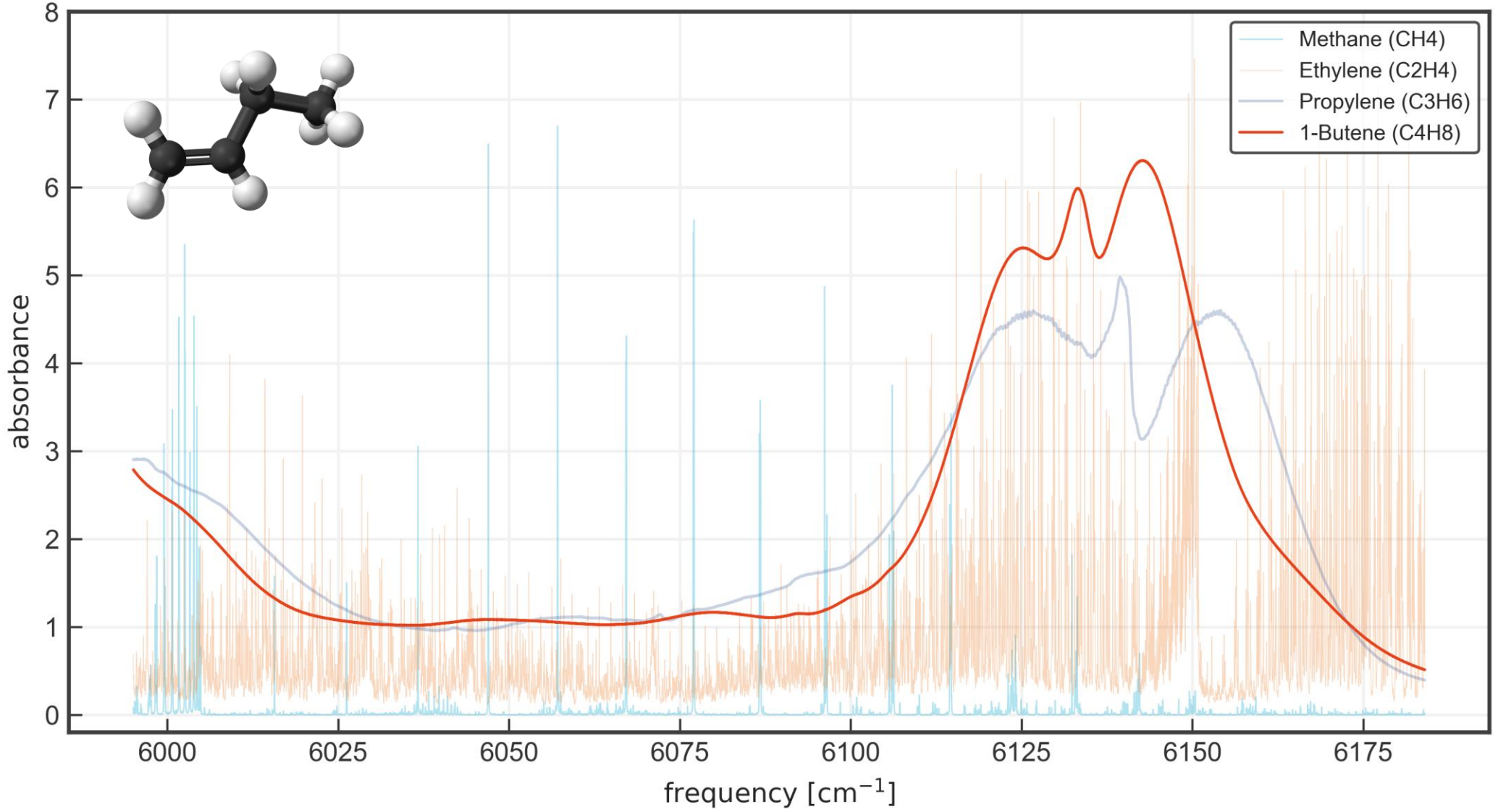
Ethylene: 6 atoms



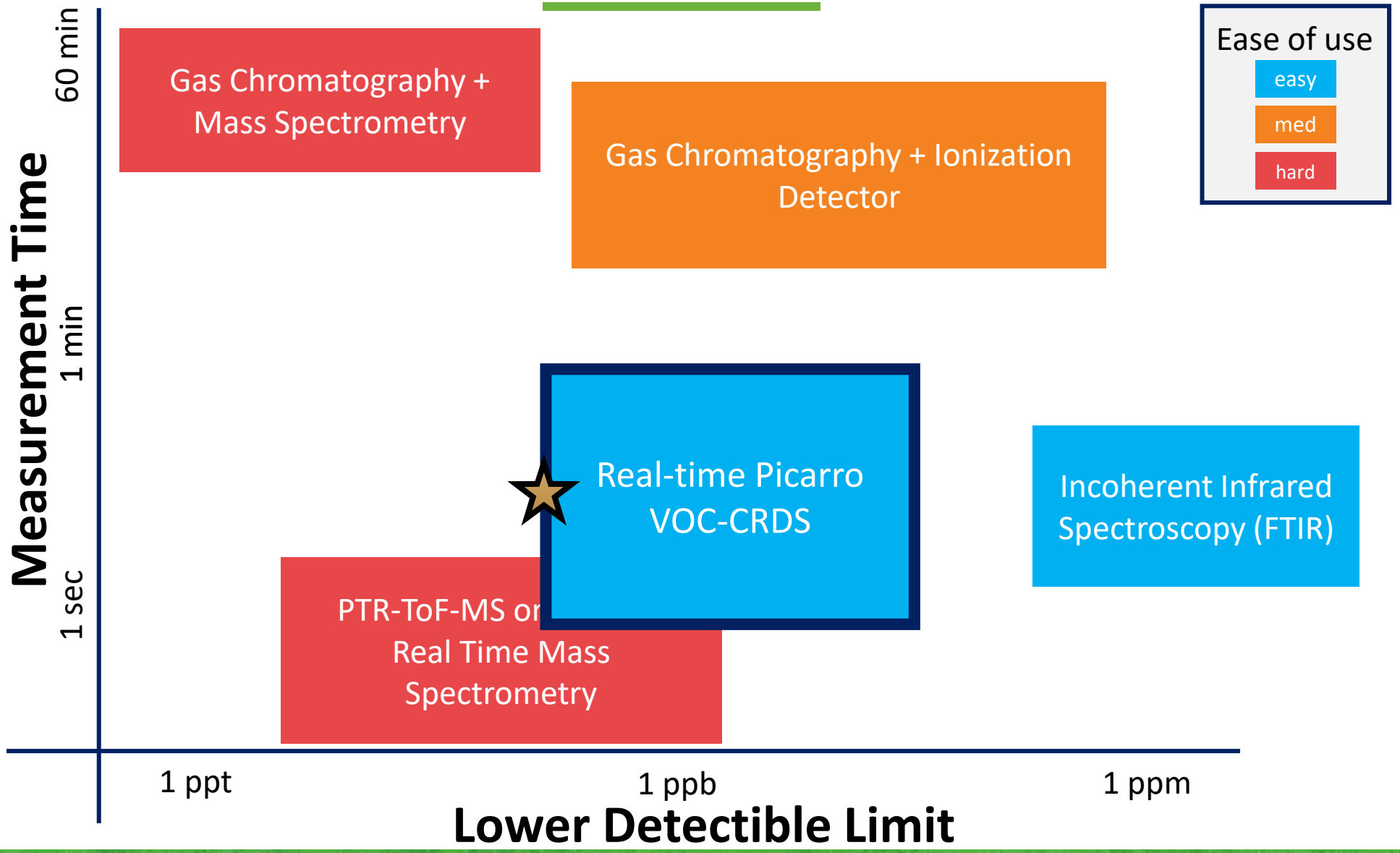
Propylene: 9 Atoms



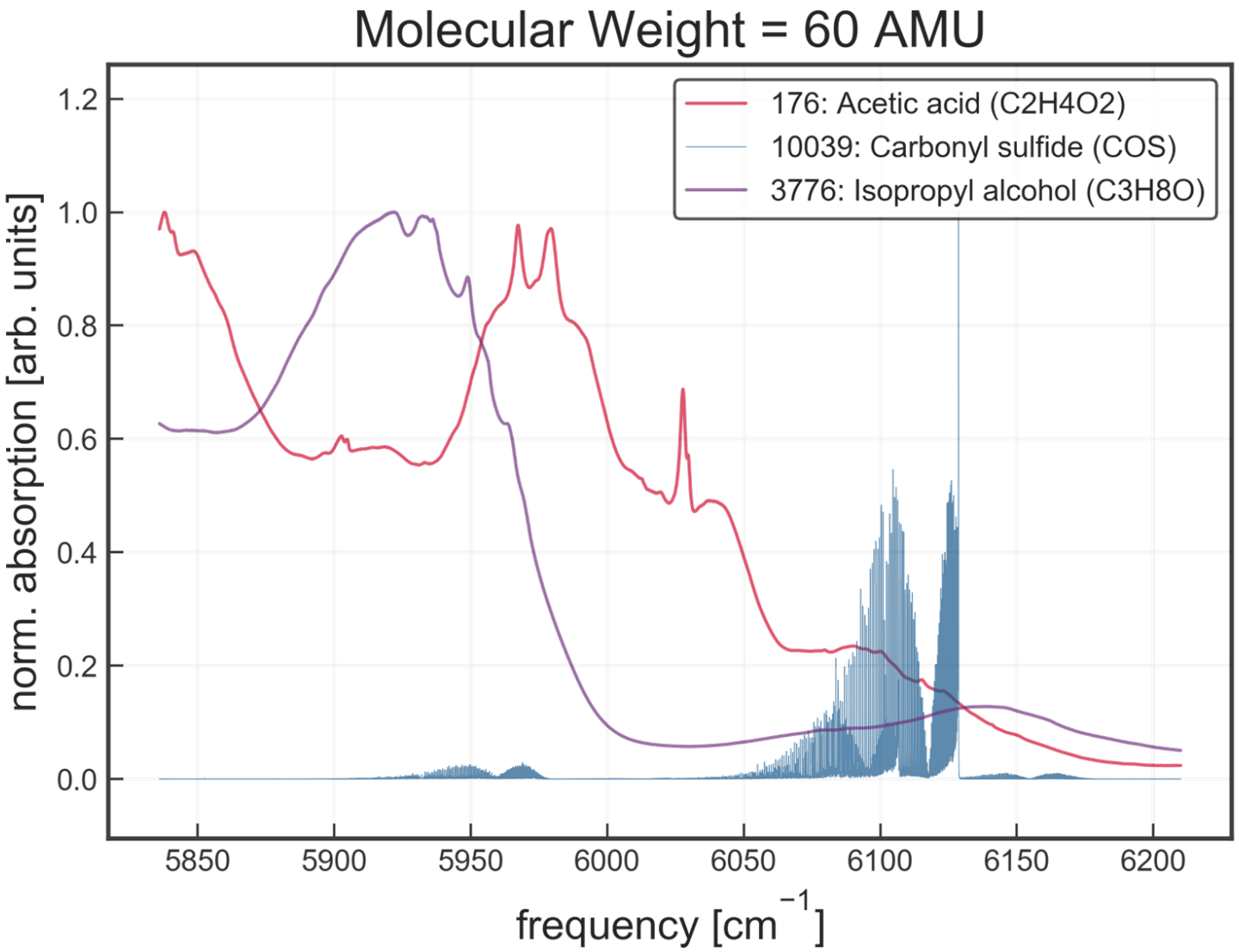
Butene: 12 Atoms



The Landscape for VOC Detection

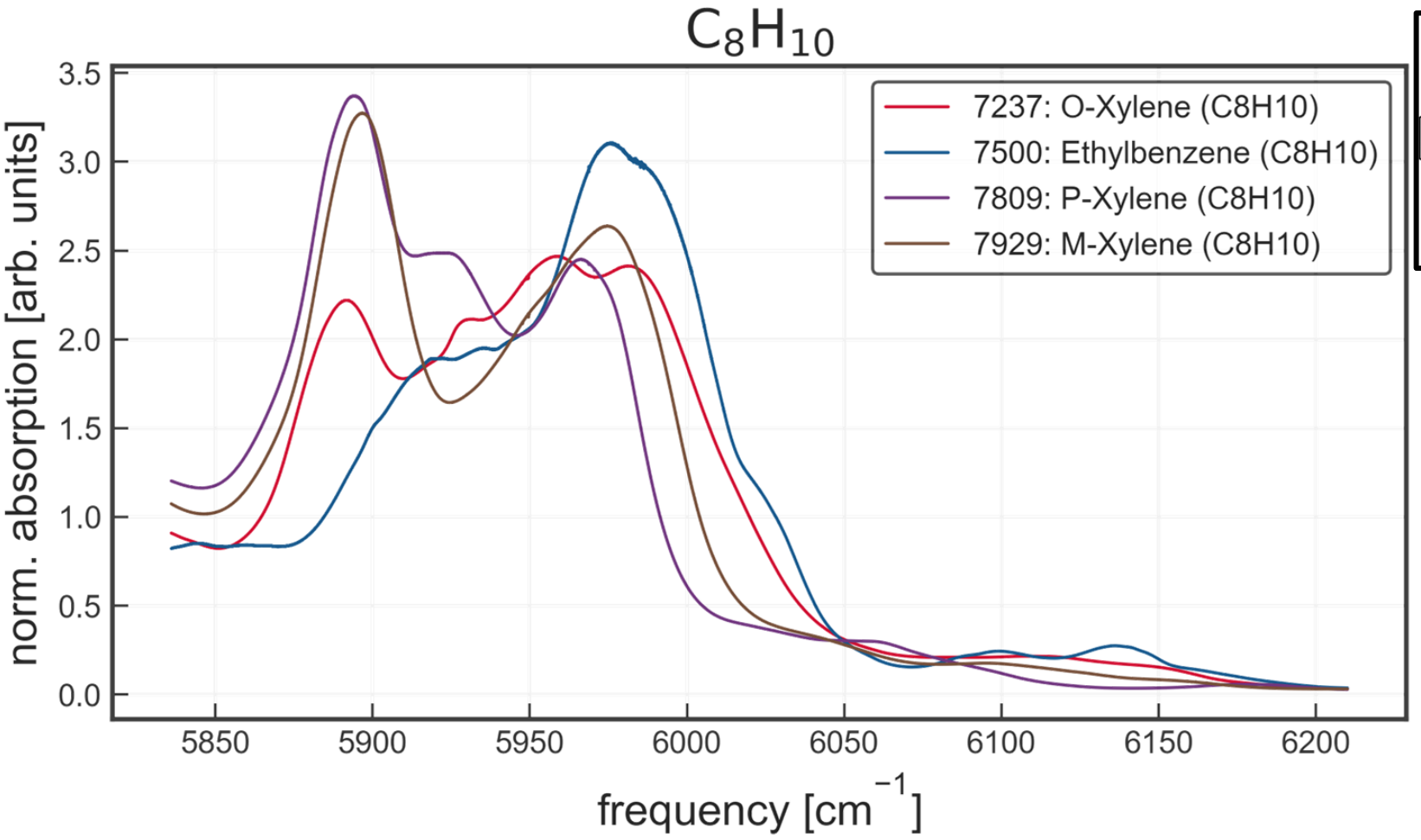


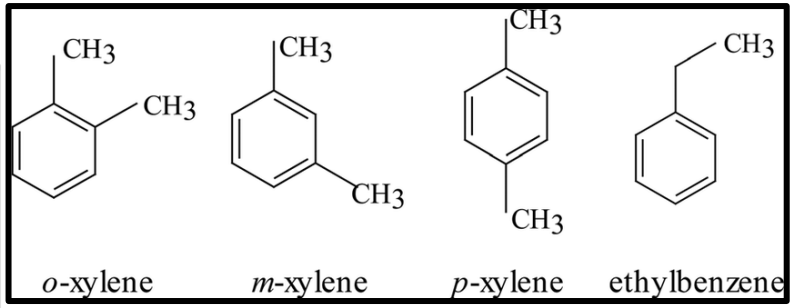
Compounds with the same mass



- distinguishing acetic acid and IPA requires more than mass alone
  - fragmentation spectrum
  - reagent ionization cross-section
  - boiling point (i.e., GC)
- With broadband CRDS, it's easy

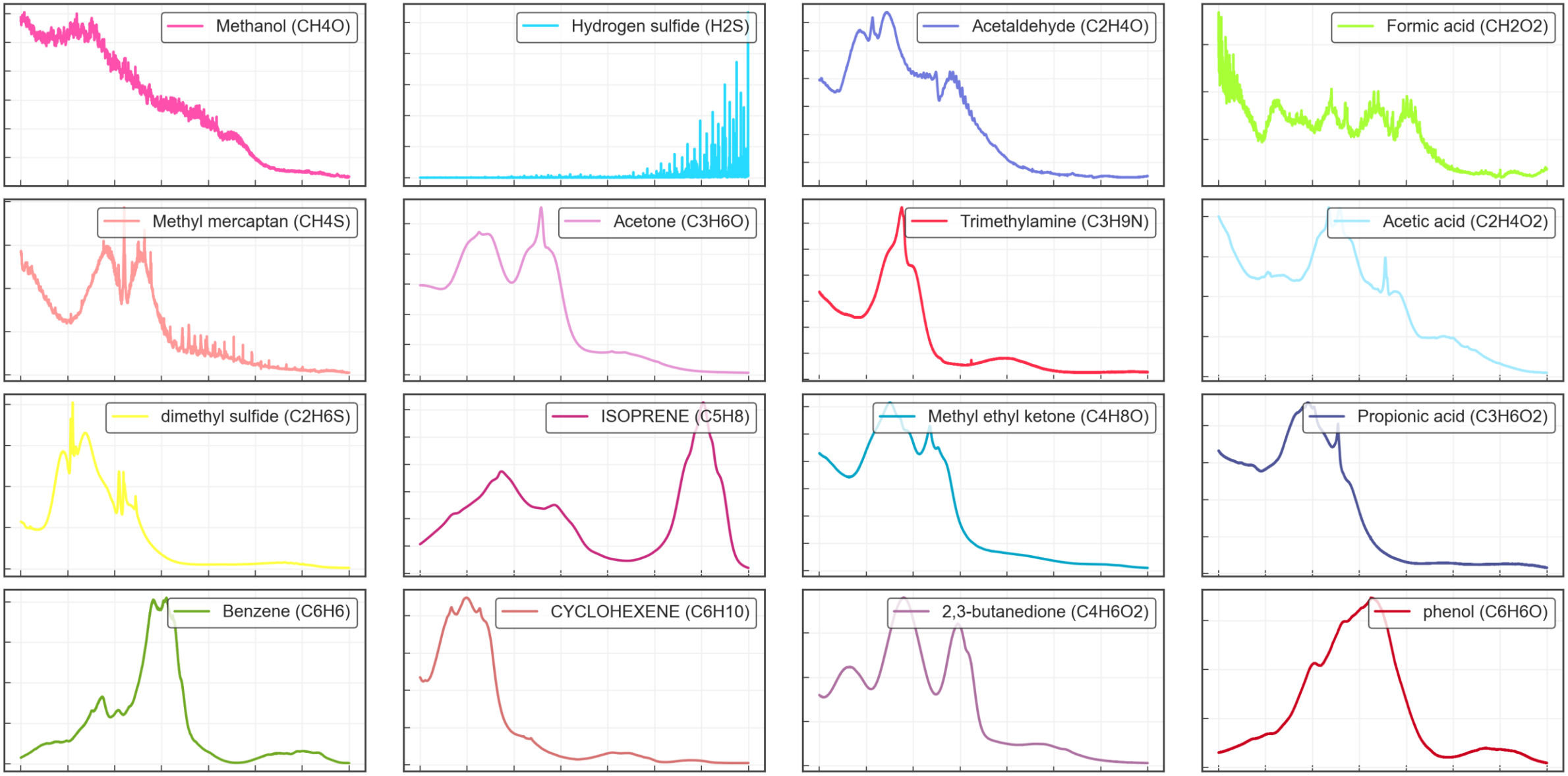
Compounds with the same Chemical Formula



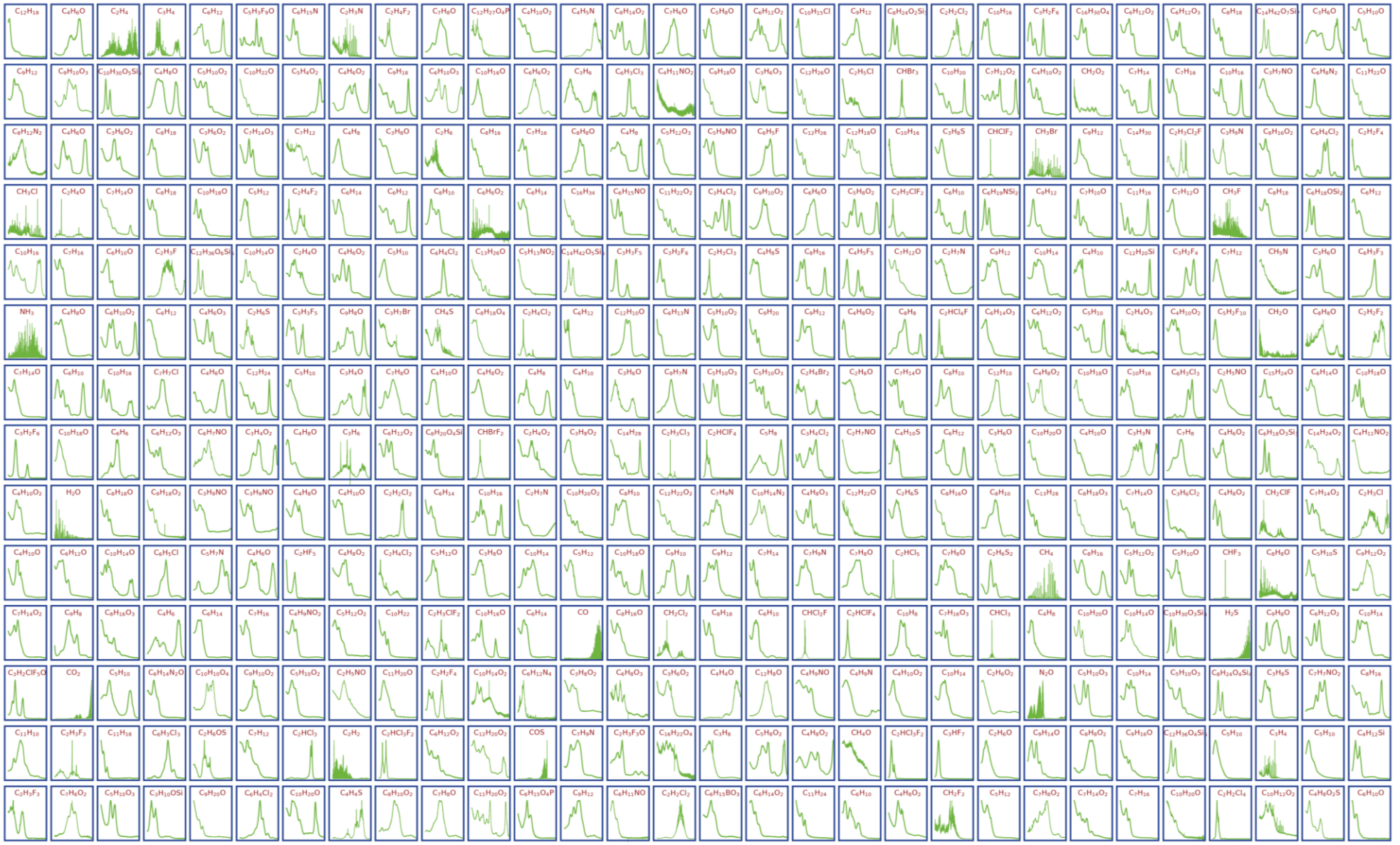


- Very difficult to separate these via MS (same mass)
- even GC struggles to separate them: m- and p-xylene have nearly the same boiling point
- With broadband CRDS, it's easy

A few relevant compounds



Spectral Library: 450 compounds and counting…



Key Features of BB-CRDS

- 10-20 compounds measured at ~ single digit ppb with a few minutes of averaging
- Measurement interval < 5 sec
- 50X more sensitive than FTIR, 50X faster than GC
- Looking for collaborators for method development in agricultural applications