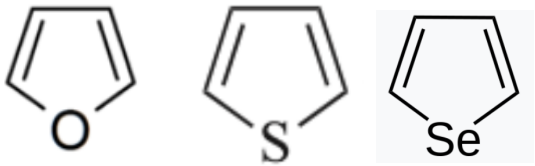
Electron-drift TPCs with ^{82}Se

H_2O H_2S H_2Se

water → hydrogen sulfide → hydrogen selenide



furan → thiophene → selenophene

- Large TPCs have the highest tech readiness of any 100-T-scalable 0vbb search method
- The option to make 100T TPCs out of anything other than xenon would be great
  - ^{136}Xe cost/availability is a killer
- ^{82}Se is abundant, high-endpoint, and its complex chemistry includes many liquid/gas forms
  - SeF_6 is electronegative (like SF_6); that's not a no-go but it's a big step down in technical readiness.

- I have suggestive evidence that H_2Se and selenophene are *electron drift gases* (H2Se: literature, selenophene: theory)
  - selenophene maybe also liquid
- effort underway to show drift/gain in the lab at CWRU
  - moving slow to get EHS details right
- Whitepaper plan: strawman design/background/sensitivity study of large ^{82}Se TPCs with electron drift
  - atmospheric-pressure H_2Se, high-pressure H_2Se, two-phase selenophene
  - Initially assume simple/mature readouts (MPGDs)
  - goal is to motivate gasRD funding
- Author list: (1) me, (2) Aneesha Avasthi, (3--) you?