

MY BACKGROUND

Catalytic partial oxidation lab: high temperature continuous flow reactors



Organic electronics lab: microfabrication, chlorinated solvents, cleanroom environment



Student representative to departmental safety committee

T.A. for chemical engineering process safety



MY PERSPECTIVE

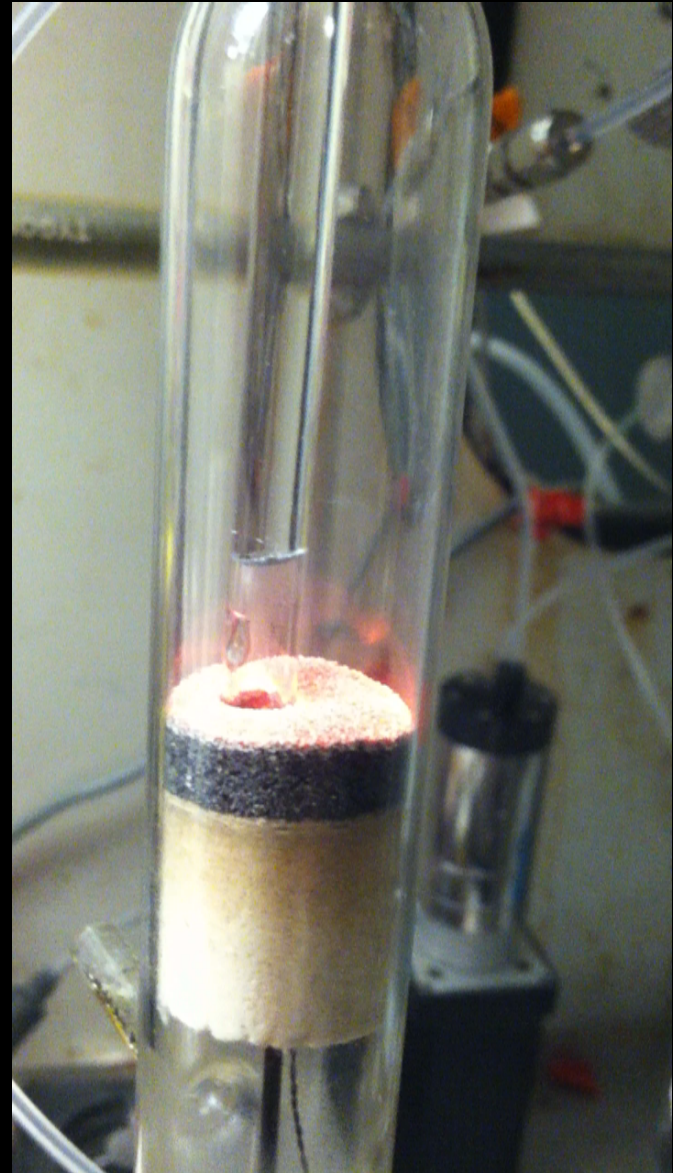
Safety = Student Culture

Safety = Professionalism

Safety = Productivity



REACTOR SAFETY



REACTOR SAFETY

Millisecond contact time CPO provides process heat for glycerol pyrolysis

H₂ / Air feed provides process heat

Glycerol feed bypasses oxidation zone

A lot can go wrong



SAFETY THROUGH PROCESS CONTROL

Worst-case: oxygen surplus -> steep temperature rise -> “pop”

In LabView reactor control, implemented an automatic oxygen shut-off in the case of fast temperature fluctuations.

Professionalism: This would be implemented in any real-world reactor

Productivity: Freed me from having to babysit the reactor




STUDENT-DRIVEN SAFETY

Safety video contest with cash prize

Viewing during new student recruitment weekend – shows that safety is important to incoming students

Students choose winner





Safety in the Modern Chemical Laboratory

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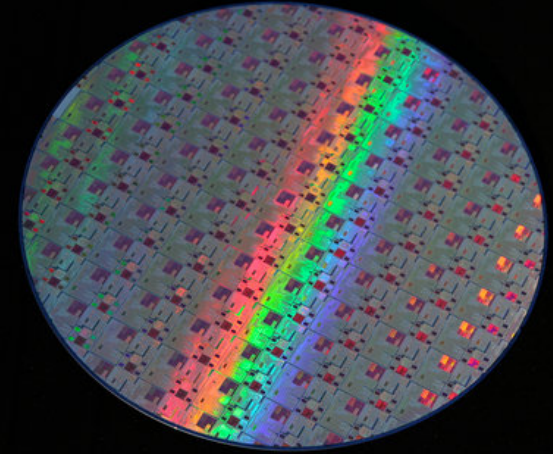
ORGANIC ELECTRONICS FABRICATION

Cleanroom:

Full body gown / goggles / gloves required

Lends to a **professional** atmosphere

No distractions – efficient use of time



Shared academic lab:

Safe practices reduce clutter, increase productivity

Labeling reduces chance of having to repeat experiments



ORGANIC ELECTRONICS FABRICATION

Safety Moment:

Student-led discussion of specific safety topic/incident at beginning of weekly group meeting

- chemical spills
- first aid
- texting and driving
- data security



Inspired by Exxon

Academic/industrial safety workshop hosted in Baytown,
TX

Representatives from six schools met to discuss successes
and challenges in lab safety

Exxon shared industrial best practices



EXXON SAFETY PALS

Industrial practices:

Behavior-based safety observation

Shadow a colleague during a high-risk procedure,
note best practices and provide feedback

Employee-driven safety culture from bottom up

Professionalism: Hearing from industry that safety is a
priority can influence students

Productivity: Safety incidents induce downtime, lost hours



CONCLUSIONS

Safety = Student Culture

Safety = Professionalism

Safety = Productivity



QUESTIONS AND COMMENTS



Reichmanis group at GA Tech



FLAMEL IGERT

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