

New Nuclear Targetry Group at SJSU

Nicholas Esker

Assistant Professor
Dept. Of Chemistry, SJSU

2022 Nov 15





- SJSU Target Group's Goal:
 - 1) Provide high quality targets for exciting nuclear reaction studies.
 - a) Acute need for target makers in US right now.
 - 2) Introduce undergraduate students to nuclear science through active research and targetry training.
 - 3) Broaden & diversify the nuclear science pipeline.
 - a) SJSU is majority-minority MSI & PUI
 - b) US undergraduates have very little exposure to nuclear science.



Current Capabilities



- Physical Vapor Deposition
 - Thickness: 50 – 5000 $\mu\text{g}/\text{cm}^2$
 - Targets produced:
 ^{208}Pb , ^{209}Bi , and ^{197}Au
- Cold rolling ($\approx 1 \mu\text{m}$ thick)
 - Targets produced: ^{54}Fe
- Solvent Casting
 - Targets produced:
 CD_2 and CH_2



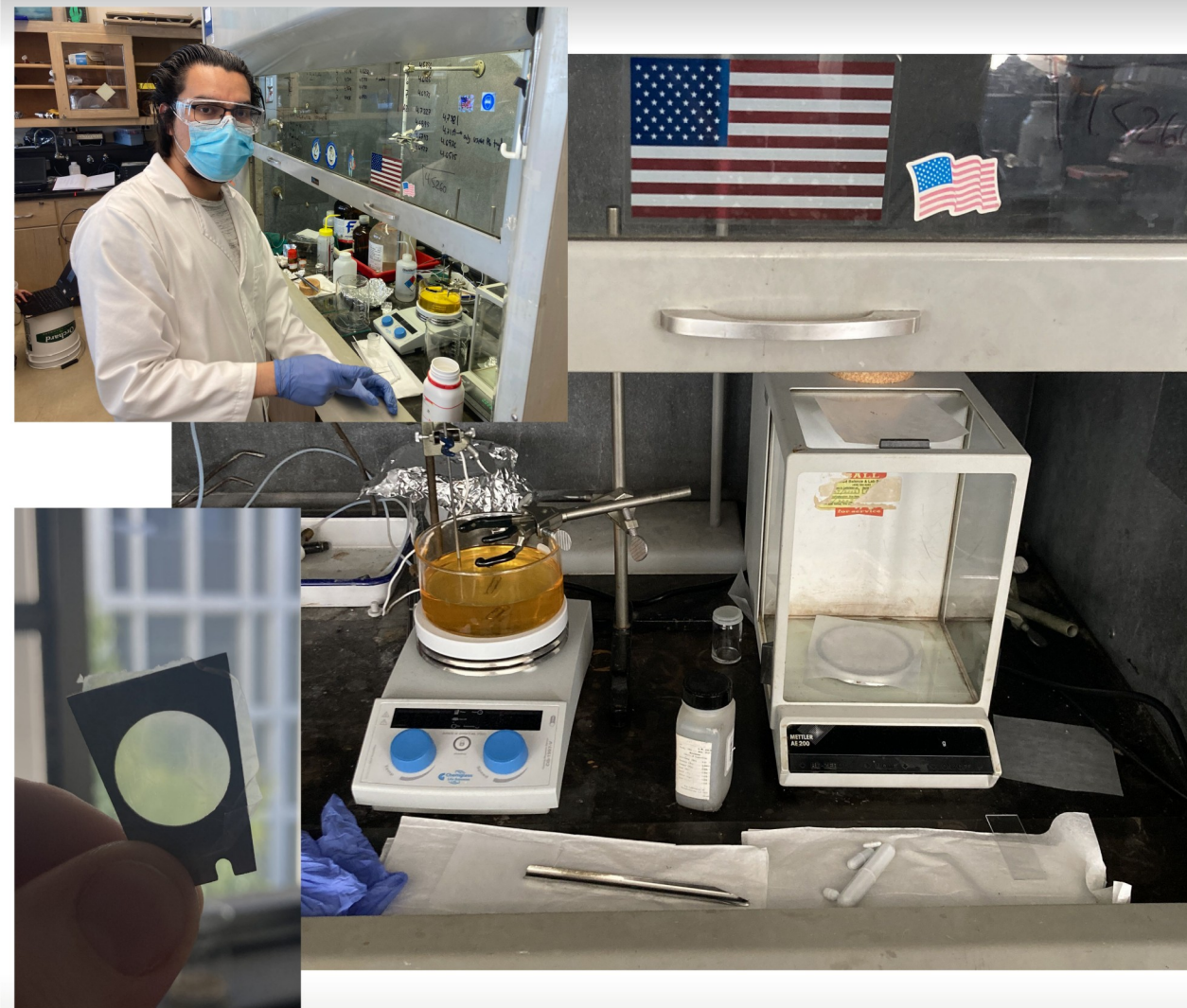
Current Capabilities



- Physical Vapor Deposition
 - Thickness: 50 – 5000 $\mu\text{g}/\text{cm}^2$
 - Targets produced:
 ^{208}Pb , ^{209}Bi , and ^{197}Au
- Cold rolling ($\approx 1 \mu\text{m}$ thick)
 - Targets produced: ^{54}Fe
- Solvent Casting
 - Targets produced:
 CD_2 and CH_2



Current Capabilities



- Physical Vapor Deposition
 - Thickness: 50 – 5000 $\mu\text{g}/\text{cm}^2$
 - Targets produced:
 ^{208}Pb , ^{209}Bi , and ^{197}Au
- Cold rolling ($\approx 1 \mu\text{m}$ thick)
 - Targets produced: ^{54}Fe
- Solvent Casting
 - Targets produced:
 CD_2 and CH_2



Future Capabilities

- e-beam evaporator for higher melting point metals
- Tube furnace for *in situ* reductions of oxide metals
- Electrodeposition/ Molecular Plating
- Evaporated actinide targets
 - ^{238}U and ^{232}Th





Future Capabilities

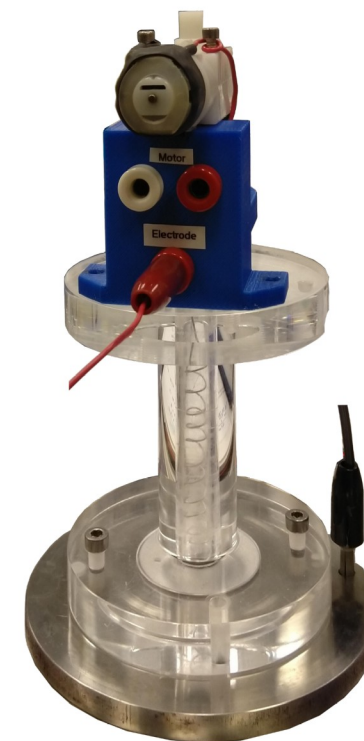
- e-beam evaporator for higher melting point metals
- Tube furnace for *in situ* reductions of oxide metals
- Electrodeposition/ Molecular Plating
- Evaporated actinide targets
 - ^{238}U and ^{232}Th





Future Capabilities

- e-beam evaporator for higher melting point metals
- Tube furnace for *in situ* reductions of oxide metals
- **Electrodeposition/ Molecular Plating**
- Evaporated actinide targets
 - ^{238}U and ^{232}Th





Future Capabilities

- e-beam evaporator for higher melting point metals
- Tube furnace for *in situ* reductions of oxide metals
- Electrodeposition/ Molecular Plating
- Evaporated actinide targets
 - ^{238}U and ^{232}Th





In Conclusion

- SJSU is a new nuclear target production and characterization lab
 - Undergraduate student training
 - Current capabilities and future plans
- Need targets? Reach out!
 - nicholas.esker@sjsu.edu
 - sjsu.edu/esker
- Thank you for your attention!

