

Glovebox Safety & Use Exam

- 1) What are the three primary components of air (with approximate percentages)? What are their nominal concentrations inside the glovebox?

- 2) The glovebox provides a controlled environment (i.e., inert, dry atmosphere).
 - a. What gas is used for the glovebox atmosphere?

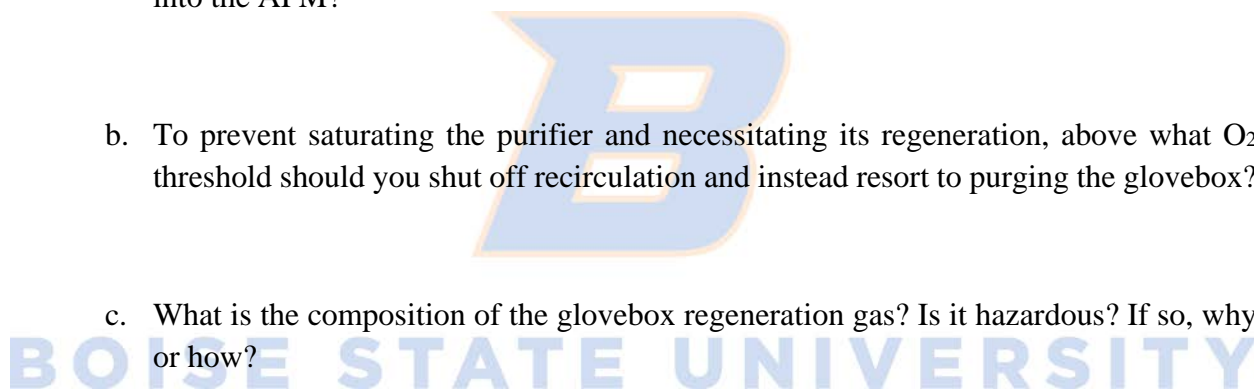
 - b. How much does a T type cylinder of this gas cost?

 - c. Is this gas denser or lighter (i.e., less dense) than air? What impact does that have on purging the glovebox atmosphere?

 - d. Why can't we use ultrahigh purity nitrogen (UHP N₂) for the glovebox atmosphere?

- 3) What is the setpoint range of pressures for the glovebox atmosphere, and where can this be seen and modified? Why is it important to always maintain a positive (as opposed to negative) pressure inside the glovebox?

- 4) What should the outlet pressure on the glovebox supply gas regulator be? Based on this, at what tank pressure should the supply tank be considered “empty” and swapped out for a new one? What should you do if the supply gas is low and/or you have to swap out the tank?
- 5) To maintain the purity of the glovebox atmosphere (in particular to eliminate O₂ and H₂O), the gas is typically continuously recirculated through the large gas purification unit located next to the glovebox.
- What is the “sweet spot” in terms of speed (expressed as a percentage of full speed) for the recirculation fan to prevent introduction of unwanted mechanical noise coupling into the AFM?
 - To prevent saturating the purifier and necessitating its regeneration, above what O₂ threshold should you shut off recirculation and instead resort to purging the glovebox?
 - What is the composition of the glovebox regeneration gas? Is it hazardous? If so, why or how?
 - How long does it take to run a regeneration cycle? With whom must this be coordinated and why? What checks need to be run prior to starting the regeneration?



- 6) What should you use the glovebox logbook for? How often should you make entries in it? Why is this important?
- 7) Should the gas (O_2 and H_2O) analyzers ever be shut off? How can you tell if they're on? If they're shut off, how do you turn them back on?



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- 8) Suppose the glovebox senses an overpressure event (>15 mbar). What will the system do in response, and how do you go about clearing the resultant alarm and turning everything back on?

9) What is the most common telltale symptom/sign of a glovebox leak?

a. Where are the most likely leakage points?

b. How can you prevent such leaks?



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10) How much does a pair of glovebox gloves cost? What about repair or replacement of a broken or compromised gas (O_2 or H_2O) analyzer?

11) Suppose you need to bring new gloves, KimWipes, or other supplies into the glovebox that are likely to have adsorbed water. What should you do to prevent compromising the glovebox atmosphere?

12) Is it possible to bring volatile liquids or pastes into the glovebox? If so, how?

13) Why is the danger of electrostatic discharge (ESD) greater in the glovebox? Why is this important in the context of AFM? What should you do to minimize this risk?



14) What are the 3 biggest no-no's when it comes to operating the antechambers?

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