This communication (*J. Am. Chem. Soc.* **2015**, *137*, 8169-8175) investigates the electrical properties of a modified rubidium Metal-Organic Framework (MOF). The questions herein focus on Figure 1 in the paper, which is shown below. This figure and the corresponding questions relate to the design and characterization of the Rb-MOF material that was used in the study.

[Insert Fig. 1 from the paper here]

1. What is being shown in part (a) of this figure?
2. What is a unit cell? How does the unit cell in this figure differ from a unit cell in a traditional metal salt, such as sodium chloride?
3. The authors in this paper utilize a Metal-Organic Framework (MOF) that they label as Rb-CD-MOF, where “CD” stands for the organic molecule -cyclodextrin. Look up the structure for -cyclodextrin. What is the benefit of using CD for this MOF? (Hint: it is related to one of the measurements shown in Figure 1a).
4. The authors in this paper utilize silver nanoclusters (AgNC) to fill the Rb-CD-MOF pores by soaking Rb-CD-MOF crystals in a solution of AgNO3 and acetonitrile. What size do you expect the AgNC’s will be inside the MOF? **Explain your reasoning.**
5. The Rb-CD-MOF was post-synthetically modified to include AgNC’s into its pores. How do the authors label their newly modified material? What does “post-synthetic” modification mean, and what symbol is used when labeling a post-synthetically modified MOF?
6. The schematic shown in part (b) gives a generalized view of the material. What do the blue cages represent? What do the gold spheres represent?
7. The schematic in part (b) also list “current” and “mass transport.” What do these terms mean?
8. Why might it be beneficial to create a material that allows for mass transport that can also produce current?
9. Looking at the schematic in part (b), how do the authors plan to produce current in this material?
10. The microscope images in parts (c) and (d) of this figure look totally different from each other. How big is the scale bar in image (c)? How does this compare to image (d)?
11. Why does image (c) appear in color whereas image (d) appears in black and white? What is different between the two imaging techniques
12. Why would the authors use two different imaging techniques for characterization? What can you see in image (c) that you cannot see in image (d)? What can you see in image (d) that you cannot see in image (c)?
13. How else (besides imaging) do the authors verify that the AgNC’s are present in the pores of the Rb-CD-MOF?
14. What range of wavelengths are the AgNC’s capable of absorbing? What energies (in eV) do these wavelengths correspond to?
15. Why are the AgNC@Rb-CD-MOF crystals in image (c) brown? What color would you expect the Rb-CD-MOF crystals to be based on the absorbance data in part (e) of Figure 1?
16. Based on your answers to the previous questions, why is the AgNC modification important to the functionality of this material?