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Example of an Exam Question Based on Student Literature Presentations

The figure below is from dx.doi.org/10.1021/ja408760w | J. Am. Chem. Soc. 2013, 135, 15726−15729 and was presented in class. The figure describes a flash quench experiment using a ruthenium chromophore attached to DNA. The blue helical protein (DPS) attached to the DNA contains iron-sulfur clusters and might provide protection against oxidative damage.

1. What oxidation is the ruthenium in the starting complex?
2. What happens to the oxidation potential of ruthenium after it is excited by light?
3. Once the ruthenium is oxidized why would it oxidize a G-base pair in DNA?
4. The paper hypothesized that DPS proteins contained reduced iron to mediate oxidative damage. What is the expected result from the experiment described in this figure that would support that hypothesis?

Use Figure 1 here from reference above.