

Lab Quiz: Halogens and the Activity Series

2002

Name: _____

Rocket Girl and her side-kick, James, carried out the following experiments:

Solution	Cl_2 (aq)	Br_2 (aq)
$\text{NaCl}_{(\text{aq})}$		
$\text{NaBr}_{(\text{aq})}$		
$\text{NaI}_{(\text{aq})}$		

For each reaction Rocket Girl and her side-kick, James, also added a few drops of TTE, to each solution.

1. Complete the above chart, indicating what if any reactions will be observed by these two amazing scientists. (Note: I am asking for the observations that these two scientists would make when filling out the above chart.)
2. Write the net ionic equations for the reactions observed above, by the amazing duo.
3. State the full name and structural formula of the compound commonly known by the name "TTE".
4. Arrange the elements in, Cl_2 , Br_2 , and I_2 in the order of their increasing oxidizing strength (weakest oxidizing agent first).
5. Now, having attained so much knowledge of the halogens, rank fluorine and astatine in their correct positions with respect to oxidizing strengths.
6. Predict the result of adding chlorine water to a solution of NaF. Justify your answer, with a plausible and reasonable explanation. If, a reaction occurs, please write the net ionic equation.
7. James, having extremely poor manipulative skills, sprinkled some iodine on his clothing. Suggest a means of removing the iodine stains from his clothing.
8. The iodide ion, I_3^{-1} are found to exist in an aqueous solution of I_2 in $\text{I}^{-1}_{(\text{aq})}$, according to the following equilibria:
$$\text{I}_{2(\text{aq})} + \text{I}^{-1}_{(\text{aq})} \rightleftharpoons \text{I}_3^{-1}_{(\text{aq})}$$
 Draw the Lewis structure for the I_3^{-1} molecule and state the shape of the molecule.
9. Explain, with justification, if Rocket Girl would be wise in choosing to wear a bracelet made of silver in a heavily chlorinated swimming pool, where she is often seen hanging around performing duties as a Life-Guard.
10. Use balanced equations to explain why an aqueous solution of chlorine is slightly acidic.
11. Ocean water contains low concentrations of bromide ions, Br^{-1} . Applying the knowledge you gained in this lab, explain how elemental bromine may be obtained from ocean water.