

Ira Remsen story: Ira Remsen (1846-1927) was an influential chemist in America. He founded the chemistry department at Johns Hopkins University and initiated the first center for chemical research in this country.

"While reading a textbook on chemistry, I came upon the statement 'nitric acid acts upon copper.' I was getting tired of reading such absurd stuff and I determined to see what this meant. Copper was more or less familiar to me, for copper cents were then in use. I had seen a bottle marked 'nitric acid' on a table in the doctor's office where I was then 'doing time!' I did not know its peculiarities but I was getting on and likely to learn. The spirit of adventure was upon me. Having nitric acid and copper, I had only to learn what the words 'act upon' meant. Then, the statement, 'nitric acid acts upon copper' would be something more than mere words.

All was still. In the interest of knowledge I was even willing to sacrifice one of the few copper cents then in my possession. I put one of them on the table, opened the bottle marked 'nitric acid', poured some of the liquid on the copper, and prepared to make an observation."

"But what was this wonderful thing which I beheld? The cent was already changed, and it was no small change either. A greenish blue liquid foamed and fumed over the cent and over the table. The air in the neighborhood of the performance became dark red. A great colored cloud arose. This was disagreeable and suffocating - how should I stop this? I tried to get rid of the objectionable mess by picking it up and throwing out of the window, which I had meanwhile opened. I learned another fact - nitric acid not only acts upon copper but it acts upon fingers. The pain led to another unpremeditated experiment. I drew my fingers across my trousers and another fact was discovered. Nitric acid also acts upon trousers.

"Taking everything into consideration, that was the most impressive experiment, and, relatively, probably the most costly experiment I have ever performed. I tell of it even now with interest. It was a revelation to me. It resulted in a desire on my part to learn more about that remarkable kind of action. Plainly, the only way to learn about it was to see its results, to experiment, to work in the laboratory."

The demonstration: Safety: Wear gloves, goggles and an apron. Put one pre 1982 penny into about 50mL of concentrated nitric acid in a 500 mL side arm flask with a stopper in top. Connect a glass tube with an elbow to the side arm flask with nalgene tubing and run it down into 1800 mL of water (with phenolphthalein indicator and a couple of mL of 0.1M NaOH) in a 2L beaker.

The science:

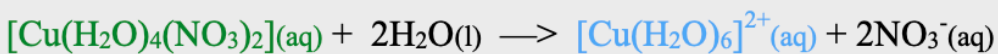
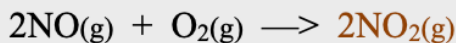
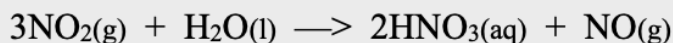
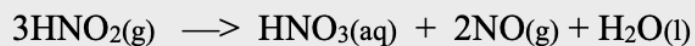
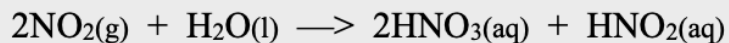
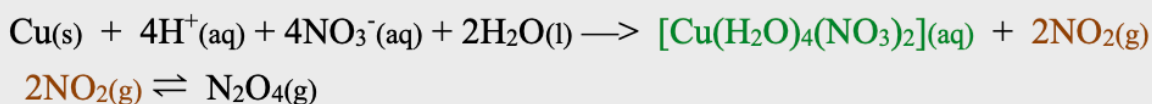
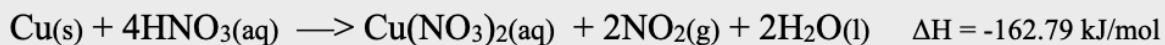
Ira Remsen

“Nitric acid acts upon copper.”

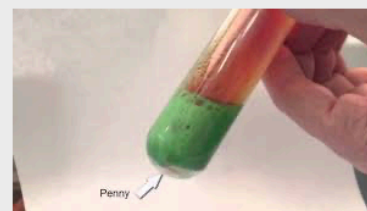


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“Nitric acid acts upon copper.”



Lab Safety
Redox Reactions
Balancing Equations
Thermochemistry (Exothermic)
Equilibrium
Increase in Entropy
Gas Pressure
Acid/Base Chemistry
Indicators (pH)



Bonding
Net ionic equations
Stoichiometry
Concentration
Molarity
Gas Laws
Free Energy
Coordination Chemistry
Isomerism

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