Phlogiston

An example of a Class Presentation paper, but not to be taken seriously as a work of science

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Chemistry 221

December 2026

Few of us now, in our "enlightened" age, have heard of the term **Phlogiston**. At one time the concept of phlogiston was primed to set the world on fire - literally! - with the implications of this novel theory.... but no longer. We shall see how phlogiston evolved from a random theory into a world of great promise which was dashed by contemporary scientific intellectual snobbism and elitism.

The theory of phlogiston was first proposed in 1867 by Johann Joachim Becher. Phlogiston as a word stems from ancient Greek and it means “burning up” or “fire”. Becher proposed that a fire-like element existed which he called phlogiston, and phlogiston is a substance which actually exists within all combustible bodies. Phlogiston is only released and observed in combustion reactions (Problemes, 1996).

Becher used the theories of alchemy to arrive at his theory. Alchemy predicted that there are four classical “elements” which constitute all things in our world. The alchemical elements are fire, water, air and water, and fire releases the phlogiston from our combustible materials. Further work by Georg Ernst Stahl (professor of medicine and chemistry at the University of Halle-Wittenberg) solidified the most common precepts of the traditional phlogiston theory.

In phlogiston theory, all materials which are capable of being burned contain phlogiston. Phlogiston itself is a substance which contains no color, odor, taste or mass. Once a substance is burned, the resulting product was considered “dephlogisticated” and existed in its “pure” form called calx. Calx is still used in the modern age to represent the residual remains once a mineral or metal has been burned or calcinated, and “traditional” chemists refer to these substances as oxides of the original material. In addition, in almost a mocking tone to this once great theory, the music band Aphex Twin named three of its tracks after various forms of Calx.

Phlogiston helped secure the discovery of nitrogen. A student of Joseph Black’s named Daniel Rutherford discovered the element nitrogen in the year 1772. Black and Rutherford used phlogiston to explain the results of their findings. They realized that their mixture of gases (currently referred to as carbon dioxide and nitrogen gas) contained more than just phlogisticated air (i.e. the carbon dioxide)... phlogiston helped pave the way for bigger and greater theories to arise in the scientific world (Klown, 1996).

Unfortunately for science and the intelligencia of the world, some in the analytical world began to question the phlogiston theory. Robert Boyle (who is best known through his work on gases and “Boyle’s Law”) performed an experiment whereby magnesium was burned in oxygen.

By weighing the magnesium before and after the burning process, he found that the product (magnesium oxide) had more mass than the original magnesium.

He coerced a colleague of his, Mikhail Lornonosov, to repeat the experiment, and (no big surprise) Lornonosov confirmed Boyle's results. Moreover Lornonosov even had the audacity to state in 1753 that the "phlogiston theory is false."

The proponents (heroes!) of phlogiston countered that phlogiston must have negative weight, or at least be lighter than air... and is this not reasonable? Anyway, the minions of Boyle and Lornonosov countered with an extensive comparison of the densities of magnesium and magnesium oxide, concluding that being lighter than air would not be enough to account for the mass increase of the magnesium after burning.

But the real archenemy of the phlogiston theory came later. Antoine-Laurent Lavoisier demonstrated through elaborate experiments that the burning (combustion) process requires a gas with mass (i.e. dioxygen), and he was able to actually weigh the gas before the reaction and measure the masses of the products after the burning... this essentially proved that phlogiston theory could not be accurate. Lavoisier and his colleagues went on to propose the "law of conservation of mass" which dictated the future role that chemistry would play in subsequent generations; also the idea that energy could be quantified (i.e. "caloric theory") also sprang into existence through these trials.

How can we take anyone seriously when, after all, their head was chopped off in the French Revolution? Lavoisier must have been an enemy of the state... and hence an enemy of "true science", so I do not need to say more on this matter. We do not take charlatans seriously in this realm of science! Absolutely not! (BetterThanYou, 2008)

Contemporary studies in science continue to help prove that phlogiston could indeed be a viable intellectual theory. Personally, I find great hope and solace in the work of Werner Heisenberg. The so-called "Uncertainty Principle" dictates that energy (momentum) and position cannot be simultaneously known with great accuracy... and I believe that a natural extension will be provided for phlogiston; the difficulty in ascertaining its existence will no doubt find a probable link to the uncertainty of the material (or perhaps its energy... or its position.... or.... well, something!) Heisenberg stands as one of the greats of contemporary science: he worked hard, he strived even harder against incredible odds. His association with Nazi propaganda should not be taken as any kind of personality defect, but instead it should be

seen as a “light of conviction” in a sea of turbulent waters. (Forget Schrödinger! Heisenberg is the greatest führer of science!!! Seig Heisenberg! Seig... ...er, um, sorry.... *blushes*) (at this point the author leaves the computer to get a glass of water and turn in his resignation letter to the Dean)

*** This paper would be continued for five pages. Using **endnotes or a list of references at the end of the report** is fine; alternatively, you can use “Problemes, 1996” type references. Do not use footnotes! ***

*** Pictures, charts, etc. are wonderful, but please make sure you have five full pages of text for credit. This paper as written has not even two full pages ***

*** This paper was written in Times font size 12, 1.5 spaced, and all margins are set at one inch. Note that your Class Presentation paper should use 1.5 spacing or less (no double spacing!) ***

References

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- Klown G, Premishe F, 2010, "Phlogiston Theory: Just the Facts, Plain and Simple", Annals of Irrefutable Science; Dec. 2010, Vol. 13, pages 334-335.

*** Include references to your scientific peer reviewed papers in this area, but place abstracts on a separate page or section. You should have at least eight references (including the peer reviewed articles), more is fantastic! ***

*** Please do not use references such as www.wikipedia.org or www.google.com - these are far too vague to be useful. URLs should be specific! See the "Class Presentations Citation Guide" (http://mhchem.org/cg) for more citation information. ***

Scientific Peer Reviewed Paper #1:

Follinya I.M., Nosnada, G., 2010, "Bringing Phlogiston Theory Back to Modern Science", Journal of Funkastic Science; Sep. 2010, Vol. 62, pages 331-332.

Abstract:

> The goal of the paper is to ensure that phlogiston theory is shown to be the coolest theory ever, and the law of mass action "theory" should be treated with extreme skepticism. Using traditional practices of Ouija and divination, the authors clearly show how phlogiston theory makes sense and all other theories are lame.

Scientific Peer Reviewed Paper #2:

Klown G, Premishe F, 2010, "Phlogiston Theory: Just the Facts, Plain and Simple", Annals of Irrefutable Science; Dec. 2010, Vol. 13, pages 334-335.

Abstract:

> The basic facts and theories about phlogiston (and its subsequent slander by the "established" scientific community) are reviewed and compared to witch craft trials of 17th century Massachusetts. Through comparative analytical tools and regression analysis, the authors conclude that the science community is mean and unfair unless you pay for an expensive membership to the American Chemical Society.

*** Make sure your reference includes a complete citation to the article as per the "Class Presentations Citation Guide" (http://mhchem.org/cg). A citation should include the authors' names, the journal title, the year, volume and page number(s), etc. These abstracts should not be part of the "normal" paper but placed in a separate section at the end. ***