

# Erasing a bit of chemistry from history

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A new study by a research team at The University of Western Australia and Murdoch University has found that an ion considered an essential part of chemistry calculations does not exist.

As a result, the researchers say it should be removed from scientific literature entirely, undermining a considerable amount of older work.

A project to investigate the use of [sulfide](#) solutions to reduce mercury emissions from alumina refineries was responsible for sparking the research team's interest in sulfide ions, a negatively charged [chemical](#) species.

Since metal sulfide ores occur naturally and in huge amounts, they are of

immense commercial value to the oil and gas industry in relation to mineral processing and environmental cleanup.

Using a specialised piece of equipment located at UWA called a Raman spectrometer (a highly-sensitive instrument to detect chemical bonds), the researchers attempted to explore the existence of the sulfide species.

Despite all efforts to produce it in an [aqueous solution](#), the free sulfide ion  $S^{2-}$  was never detected.

The new understanding could impact on a wide range of industrial and environmental processes that use this as the basis for their chemistry calculations.

Dr. Darren Rowland, from UWA's Faculty of Engineering and Mathematical Sciences, said the experiment revealed that basic experiments from 30 years ago have been wrongly interpreted.

"It means that some simple chemistry calculations, often used to predict how sulfide minerals dissolve and react in water, are incorrect," Dr. Rowland said.

"Our recommendation to researchers and teachers is to not accept the existence of sulfide ion in aqueous solution, as there is no evidence for its existence."

"We hope our results now take a firm hold in chemical calculations, but time will tell."

The study is published in the current edition of the journal *Chemical Communications*.

**More information:** P. M. May et al. Goodbye to S<sub>2</sub><sup>−</sup> in aqueous solution, *Chemical Communications* (2018). [DOI: 10.1039/C8CC00187A](https://doi.org/10.1039/C8CC00187A)

Provided by University of Western Australia

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