

News Release

Radical discovery unveils an 80 year old mystery

For 80 years the Grignard reaction has been used to make important chemicals including anti-cancer drugs, without scientists knowing exactly how the reaction worked.

Researchers at the University of Melbourne have now solved the mystery, identifying the steps of this famous reaction.

Grignard reactions, which are widely used in the synthesis of many important pharmaceuticals such as advanced breast cancer medication and in manufacturing food and beverages, have long challenged chemists interested in understanding how they work.

“Since 1927 organic chemists have generally accepted the proposed involvement of the Gomberg-Bachmann ketyl radical in the Grignard reaction, but until now its existence has only been indirectly inferred based on the formation of side products,” says Dr George Khairallah of the University of Melbourne and member of the ARC Centre of Excellence for Free Radical Chemistry and Biotechnology.

“For the first time we have been able to observe an anion equivalent to the elusive Gomberg-Bachmann ketyl radical in gas phase using advanced mass spectrometry experiments in conjunction with density functional theory” reveals the research group leader Professor Richard O’Hair of the University of Melbourne and member of the ARC Centre of Excellence for Free Radical Chemistry and Biotechnology.

“It is exciting to have tackled a textbook reaction and show that an 80 year old proposed intermediate can actually be made and the steps in the reaction observed..”

The group’s work will be published in the Chemistry journal *Angewandte Chemie* this month (citation: Thum, C.; Khairallah, G.N.; O’Hair, R. A. J. “Gas Phase Formation of the Gomberg-Bachman Magnesium Ketyl.”, *Angew. Chem. Int. Ed.*, DOI: 10.1002/anie.200803463).

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