

Chih-Hsin Chen & Po-Shen Pan Receive Gold Award in Taiwan Innotech Expo

Campus focus

From the Department of Chemistry, Chair Chih-Hsin Chen and Associate Professor Po-Shen Pan 's team participated in the 2023 Taiwan Innotech Expo held from October 12 to 14 at the Taipei World Trade Center. Dr. Chen was awarded a gold medal for the invention competition with the research theme “The system and Methods for Sensing Ammonia Gas,” and Dr. Pan received a gold medal for the research topic “Preparation Method of Tetraboronic Acid Compounds, and Tetraboronic Acid Compounds.” Both projects have already obtained patents in the Republic of China.

Dr. Chen invented a method for precisely measuring the proportion of ammonia in the air using test paper, which can improve the environment in chicken farms or other breeding facilities. He hopes that in the future, businesses can consider enhancing their equipment and quality based on the test results, leading to a transformation in practices. He believes that exhibiting this innovation provides students with an opportunity to gain experience, not only in winning awards but also in accumulating valuable learning experiences.

Dr. Chen also mentioned that the expo had many international exhibitors, which is highly beneficial for promoting our university. Besides increasing the university's visibility, it also helps to recognize our excellent research capabilities. He shared the purpose of participating in the exhibition, which is to make the invention available for more people in need and help them determine how to use it.

Dr. Pan stated that since 2003, major pharmaceutical companies worldwide have introduced a total of 6 boron-containing drugs targeting various diseases. Just in 2019, the global sales of boron-containing drugs reached nearly 2.2 billion US dollars. Generally, the synthesis of boron-containing drugs is challenging and requires a series of complex synthesis steps, making the development costs high. This invention offers several

advantages, including simplicity of operation, shorter reaction time, and high synthesis efficiency. For companies looking to develop boron-containing drugs, this can significantly reduce research and development costs.

Dr. Pan shared that both of these inventions received gold medals. Subsequently, they plan to use these 2 patents to jointly develop new technological applications and are also considering applying for patents in the Republic of China.



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淡江大學 四硼酸化合物的製備方法及四硼酸化的功能與實用性

Preparation Method of Tetraboric Acid Compound and Tetraboric Acid Compound

中華民國發明專利號碼T707665 / 美國發明專利號碼

功能與實用性

由於這項發明提供了一種方便、快速且高效的化學方法，因此可以大幅減少投入含硼藥物開發的經費的人力與成本投入，從而極大地提高廠商的競爭力。

- (1) 多硼化合物之合成：
在本研究中，我們針對含硼有機物和其他含硼化合物 U₂-4C₂ 進行了優化，並成功地使用微波反應器合成了具有四硼酸官能基的含硼有機物。與以往只能將單一硼化合物與硼酸或硼酸衍生物混合，本專利技術實現了將四硼酸官能基一次性地引入到有機物中。
- (2) 含硼藥物與發光團(DAHMI)結合：
含硼藥物在腫瘤組織的溫度高低決定了硼中子俘獲(BNCT)的效率。因此如何評估含硼藥物與發光團的結合效率對於藥物開發至關重要。我們使用近幾年來由 MIT 所開發的發光團(DAHMI)技術來評估含硼藥物與發光團的結合。此方法將含硼藥物是否導入細胞內。
- (3) 含硼藥物與發光團(DAHMI)結合：
由於 DAHMI 與發光團的結合是穩定的，因此我們將其應用於含硼藥物。目前已具有含硼藥物與發光團的結合過程如下：(1) 首先，將含硼藥物與發光團混合，加入 DAHMI，將其浸泡 30 分鐘。(2) 在此之後，將藥物與發光團混合，最後將藥物與發光團混合，並使用發光團進行觀察即可。

▲ 含硼藥物與發光團的結合過程

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