

## Supplementary Information

### Well Defined Rich Electronic Structure: Facile Approach for Nido-Carborane Fused Azaspirodecaniums in Water Solution

Zhixiang Lv,<sup>a</sup> Zhou Wang,<sup>b</sup> Fuyan Xiao<sup>c</sup> and Guofan Jin \*<sup>c</sup>

<sup>a</sup>Department of Pharmacy, Danyang People's Hospital, 212300 Danyang, P. R. China

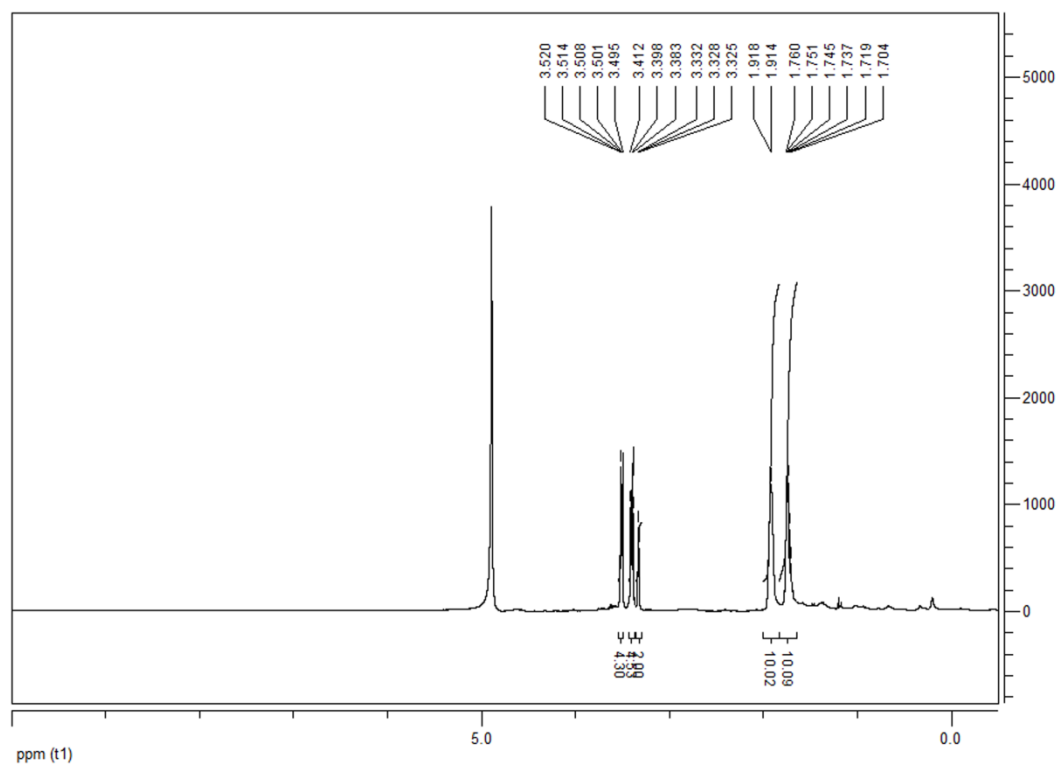
<sup>b</sup>College of Vanadium and Titanium, Panzhihua University, 617000 Panzhihua, P. R. China

<sup>c</sup>School of Pharmacy, Jiangsu University, 212013 Zhenjiang, P. R. China

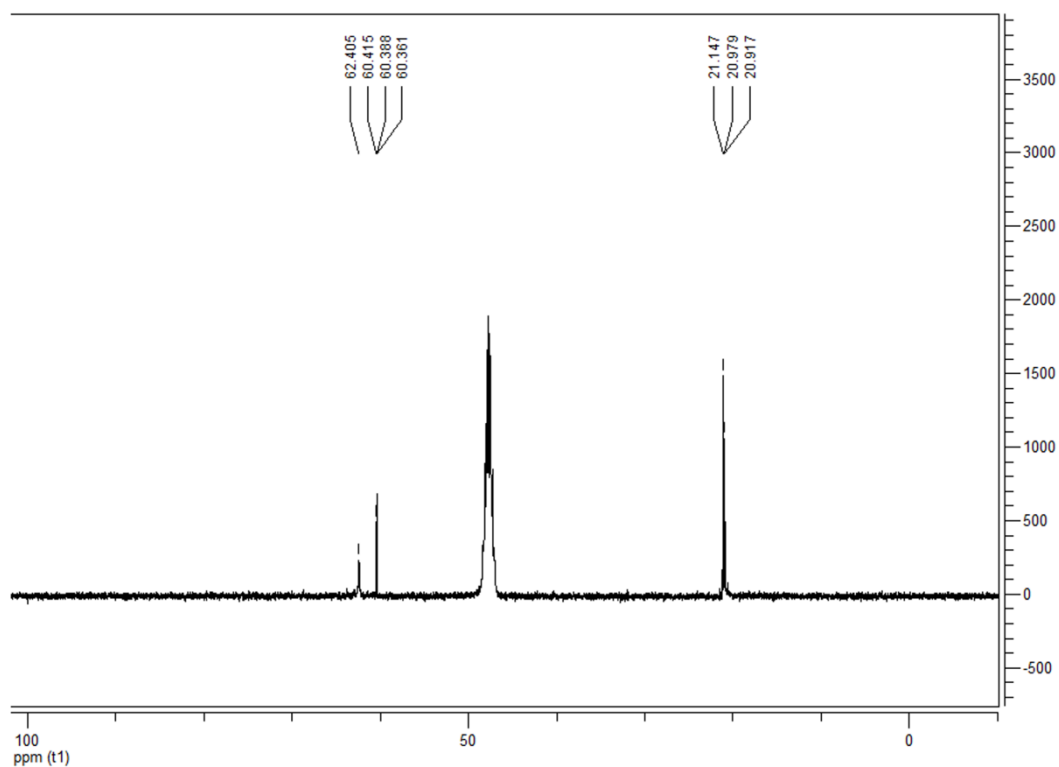
---

\*email: organicboron@ujs.edu.cn

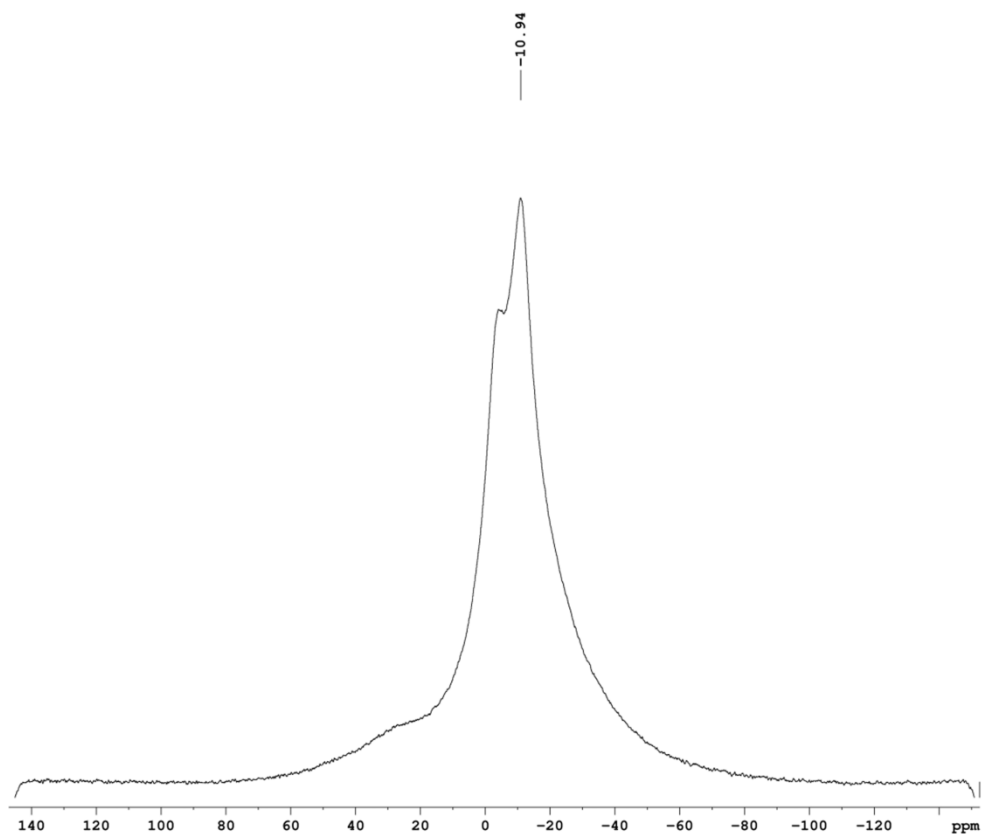
Compound bis(4-azaspiro[3.4]octan-4-ium)-nido-*ortho*-caborane



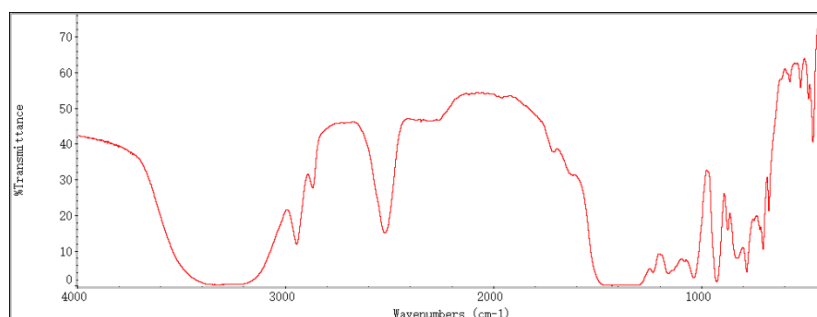
**Figure S1.**  $^1\text{H}$  NMR (400 Hz,  $\text{CDCl}_3$ ) of bis(4-azaspiro[3.4]octan-4-ium)-nido-*ortho*-caborane.



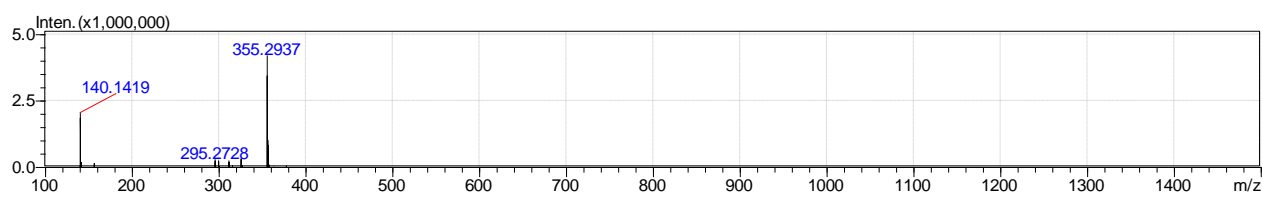
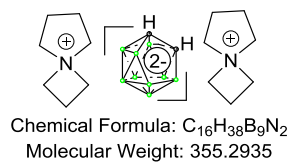
**Figure S2.**  $^{13}\text{C}$  NMR (100 Hz,  $\text{CDCl}_3$ ) of bis(4-azaspiro[3.4]octan-4-ium)-nido-*ortho*-caborane.



**Figure S3.**  $^{11}\text{B}$  NMR (75 Hz,  $\text{CDCl}_3$ ) of bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane.



**Figure S4.** IR (KBr) of bis(4-azaspiro[3.4]octan-4-ium)-nido-*ortho*-caborane.



**Figure S5.** HRMS of bis(4-azaspiro[3.4]octan-4-ium)-nido-*ortho*-caborane.

Compound bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane

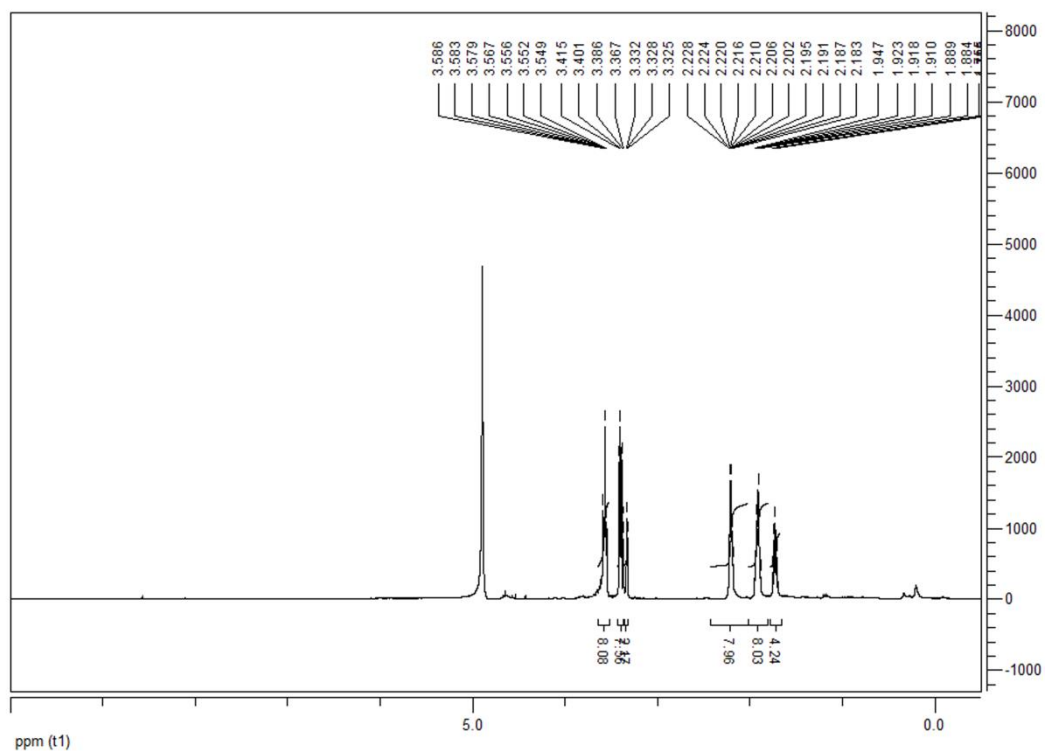


Figure S6.  $^1\text{H}$  NMR (400 Hz,  $\text{CDCl}_3$ ) of bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane.

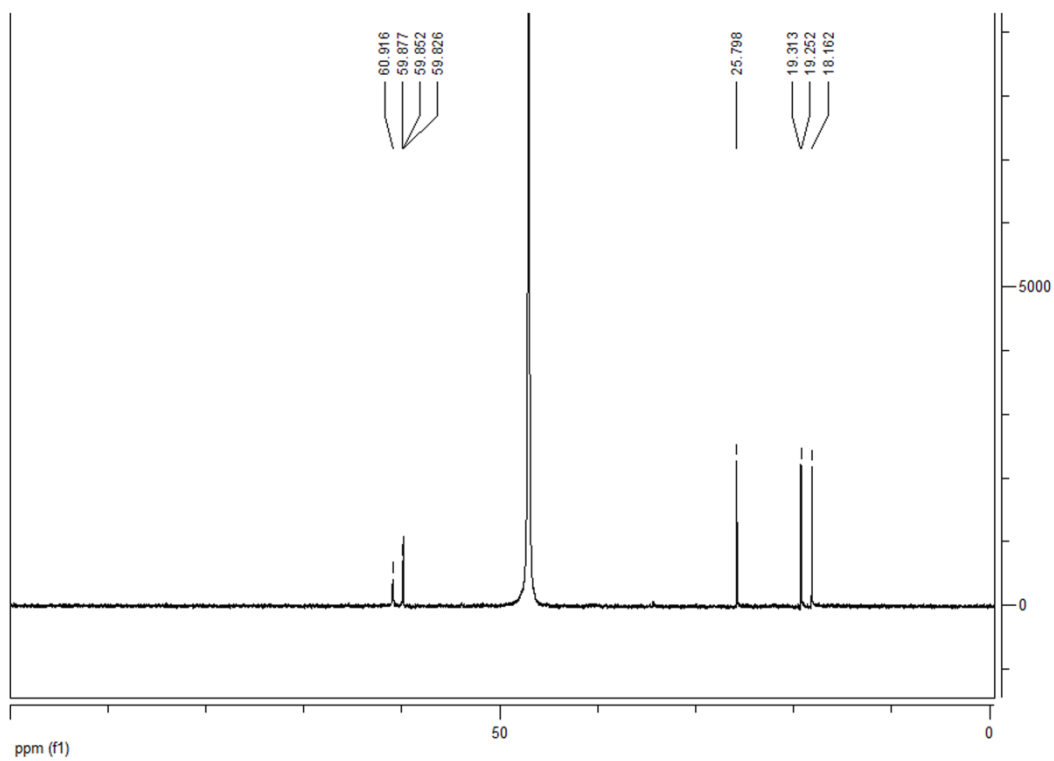
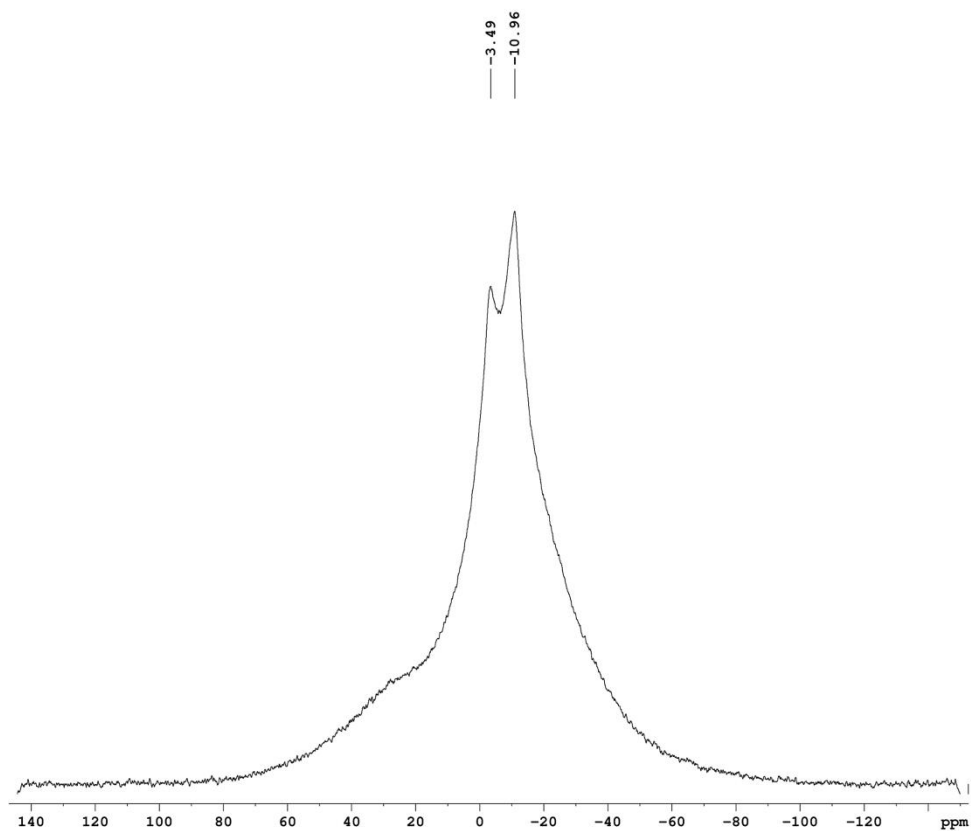
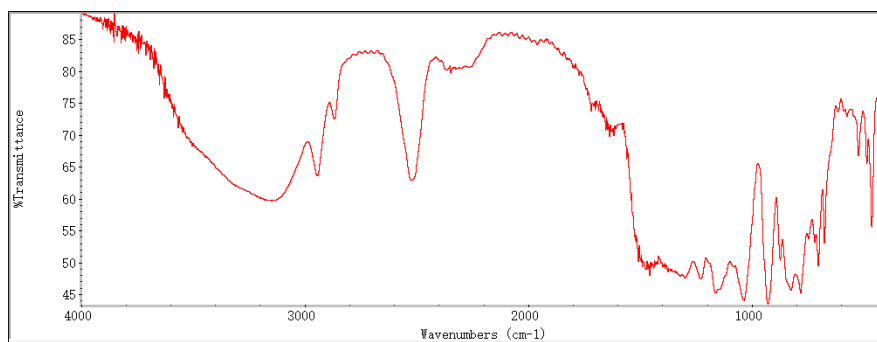


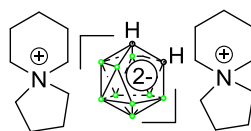
Figure S7.  $^{13}\text{C}$  NMR (100 Hz,  $\text{CDCl}_3$ ) of bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane.



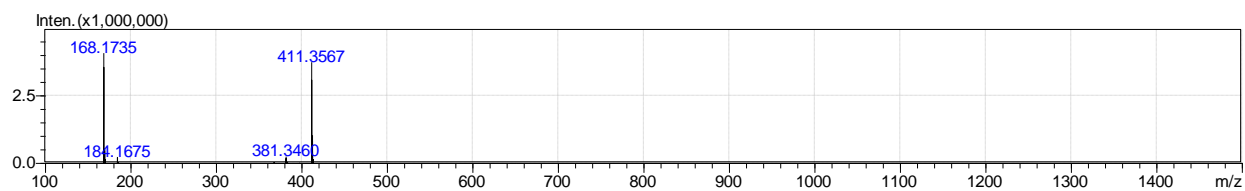
**Figure S8.**  $^{11}\text{B}$  NMR (75 Hz,  $\text{CDCl}_3$ ) of bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane.



**Figure S9.** IR (KBr) of bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane.



Chemical Formula:  $C_{20}H_{46}B_9N_2$   
Molecular Weight: 411.3565



**Figure S10.** HRMS of bis(5-azaspiro[4.5]decan-5-ium)-nido-*ortho*-caborane.