

## Electronic Supplementary Information (ESI)

### Bisamide based Non-nucleophilic Electrolytes for Rechargeable Magnesium Batteries

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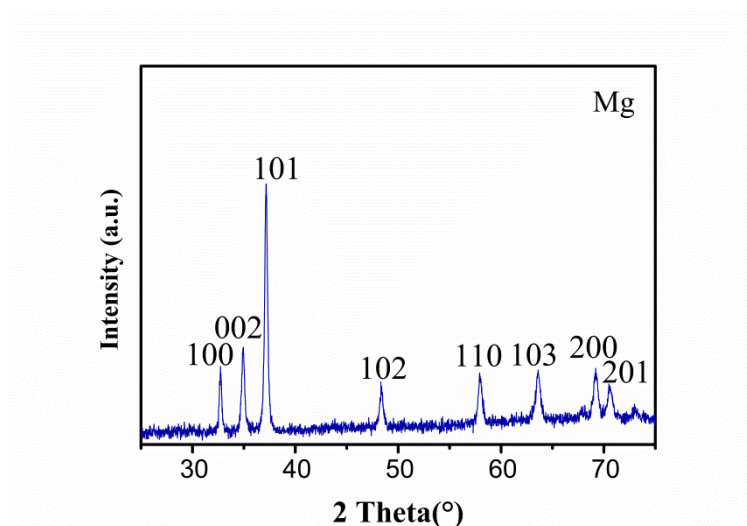


Fig. S1 XRD pattern of magnesium deposited on platinum.

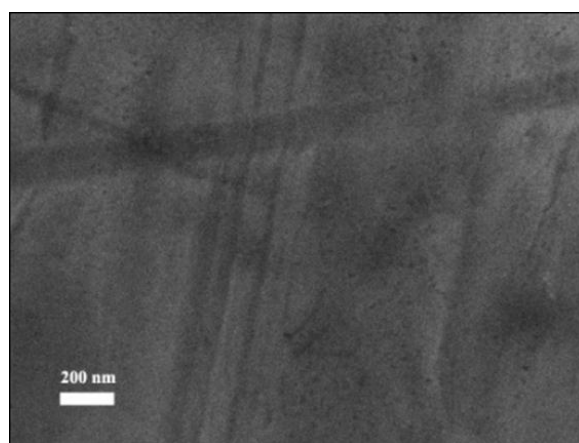
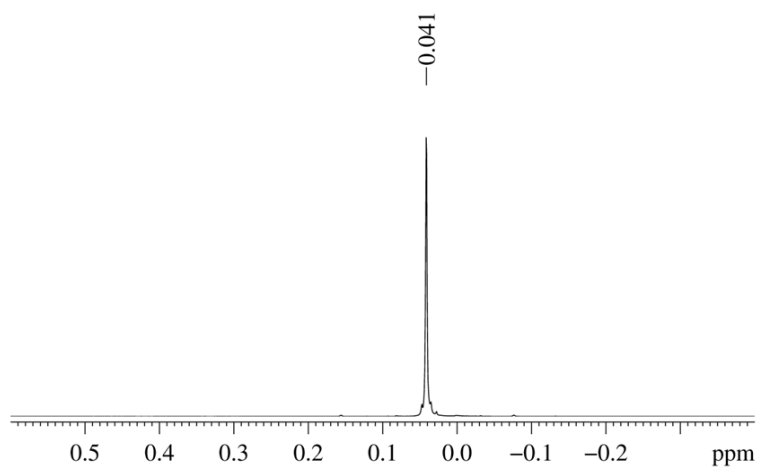


Fig.S2 SEM image of magnesium deposit after 60 cycles.

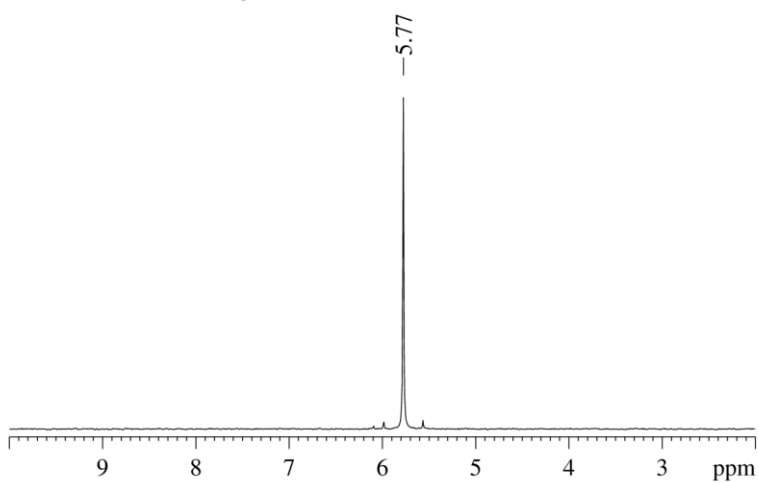
\* The strips were caused by the glass fibres of the separator in the cell.

## NMR spectra

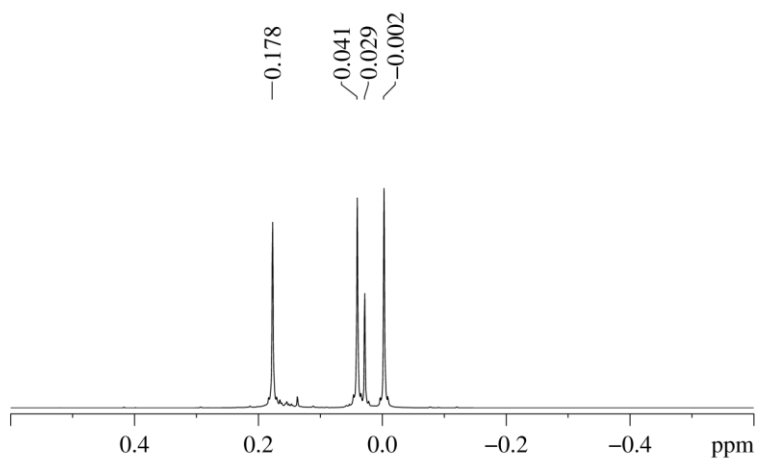
<sup>1</sup>H NMR (HMDS)2Mg



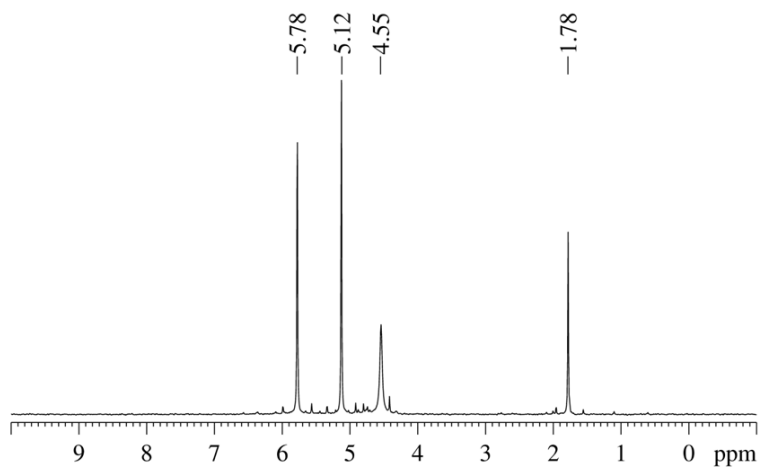
<sup>13</sup>C NMR (HMDS)2Mg



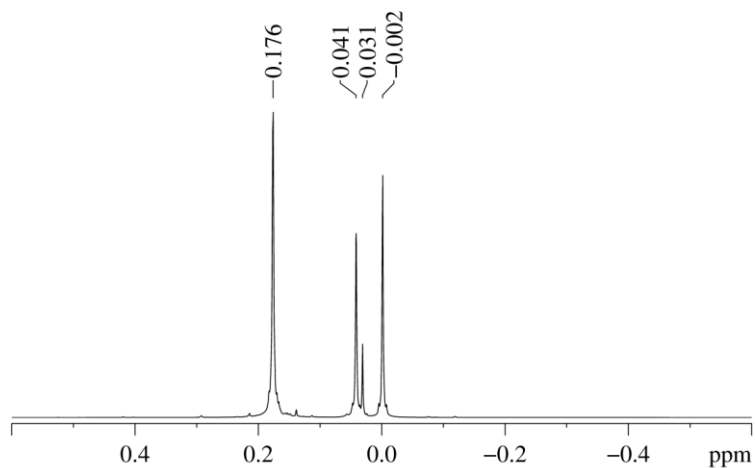
$^1\text{H}$  NMR 2(HMDS) $_2\text{Mg}-\text{AlCl}_3-\text{THF}$



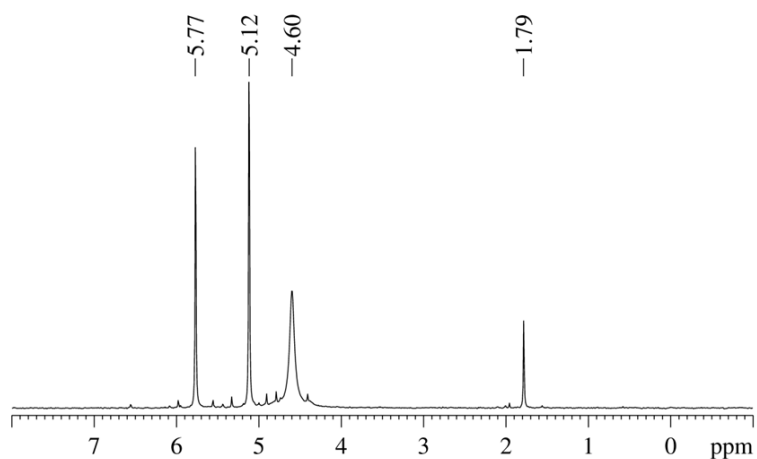
$^{13}\text{C}$  NMR 2(HMDS) $_2\text{Mg}-\text{AlCl}_3-\text{THF}$



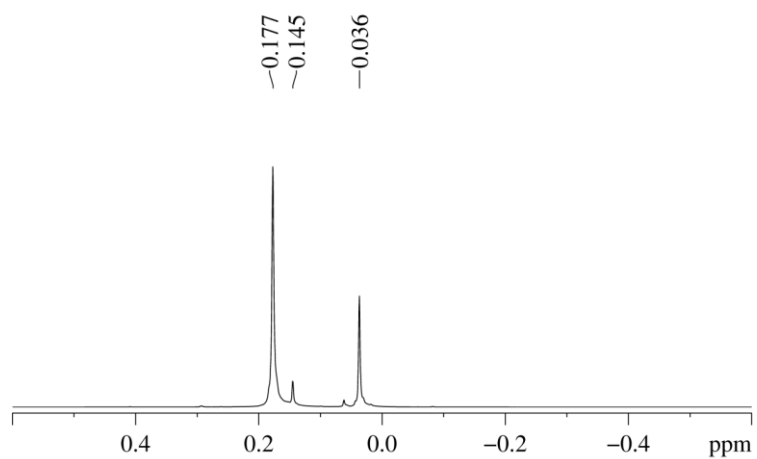
$^1\text{H}$  NMR (HMDS) $_2\text{Mg}-\text{AlCl}_3-\text{THF}$



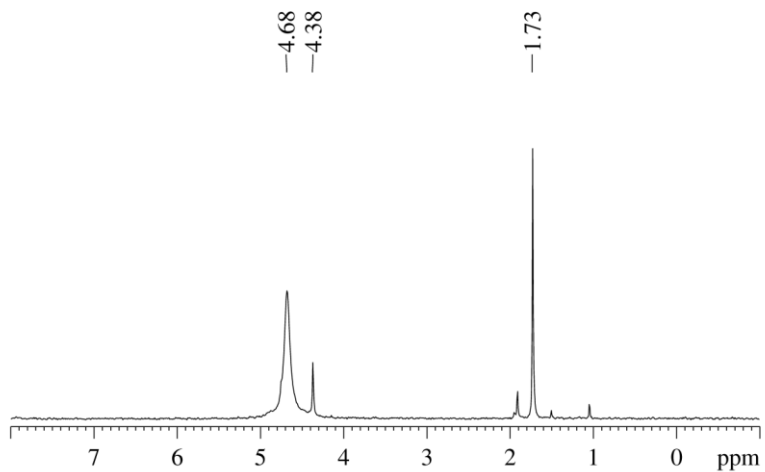
$^{13}\text{C}$  NMR (HMDS) $2\text{Mg}-\text{AlCl}_3-\text{THF}$



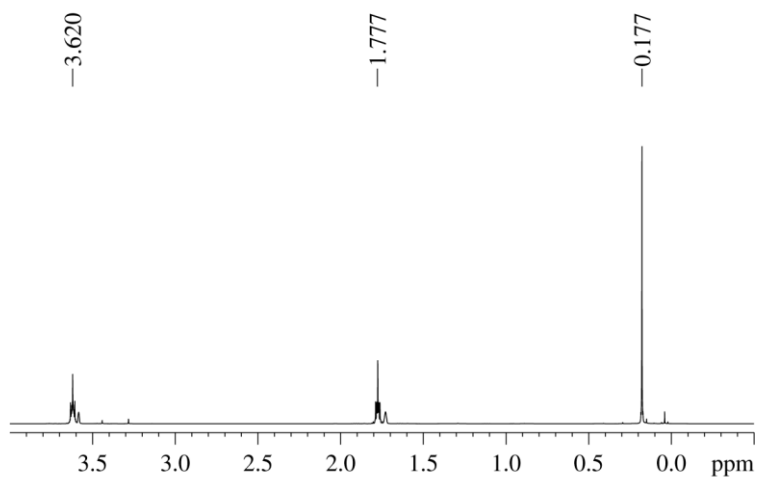
$^1\text{H}$  NMR (HMDS) $2\text{Mg}-2\text{AlCl}_3-\text{THF}$



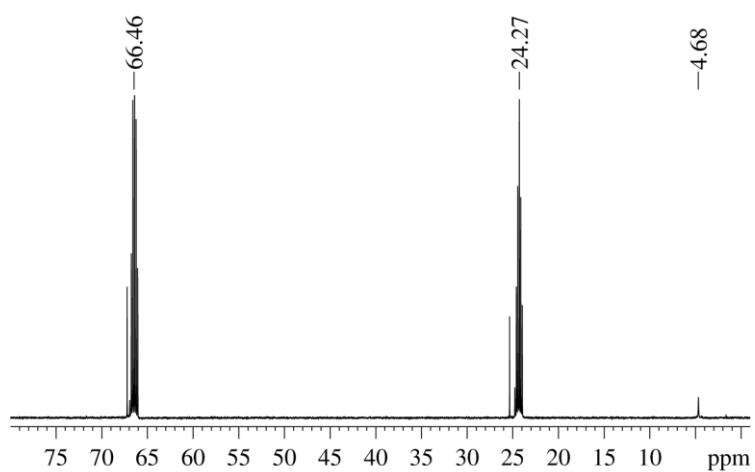
$^{13}\text{C}$  NMR (HMDS) $2\text{Mg}-2\text{AlCl}_3-\text{THF}$



$^1\text{H NMR}$  [ $\text{Mg}_2\text{Cl}_3 \cdot 6\text{THF}$ ][ $\text{HMDSAICl}_3$ ]-THF



$^{13}\text{C NMR}$  [ $\text{Mg}_2\text{Cl}_3 \cdot 6\text{THF}$ ][ $\text{HMDSAICl}_3$ ]-THF



## MS Spectra of HMDSAICl<sub>2</sub>

