Li-air batteries have a much higher theoretical gravimetric energy storage density than all other candidate battery chemistries and this has led to a strong interest in developing such batteries for powering EVs, enabling driving ranges comparable to gasoline powered automobiles. However, many fundamental challenges need to be solved before these batteries can become practical. I will address three issues, based on density functional theory calculations and electrochemical modeling coupled with experiments, relating to the practicality of non-aqueous Li-air batteries - (1) Thermodynamic efficiency, (2) Deep discharge and (3) Rechargability of non-aqueous Li-air batteries.

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