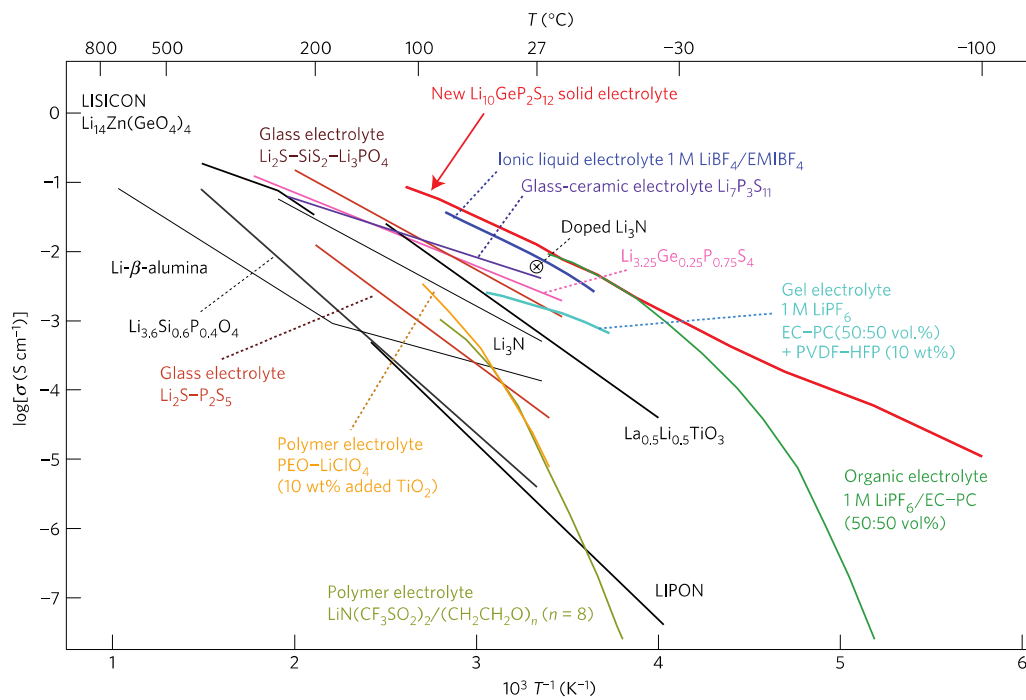


Q: What about thermal stability of Li-air batteries?

If I understood the question correctly the question concerns upper temperature limit for normal Li-air battery operation. If we exclude the issues connected with thermal stability of battery packaging materials from our consideration there still will be 2 limitations: lithium melting temperature (about 180°C) and rapid electrolyte evaporation at elevated temperature. For electrolytes like e.g. ionic liquids it is possible to avoid rapid evaporation and maintain electrolyte stable at temperature higher than 100°C.

Q: Is it possible to use Li-air batteries at -40 C?

The major problem at -40°C is low Li⁺ conductivity of electrolytes. Depending on Li-air battery type and design it can comprise one liquid electrolyte or couple of different liquid electrolytes for negative electrode and for positive electrode, that are separated by solid lithium conductive electrolyte. The diagram below illustrates the temperature dependence of ionic conductivity of different electrolyte types.



Some electrolytes even freeze at such temperature totally blocking ionic conductivity. So in general it would be possible to use some types of Li-air batteries at -40°C (those where none of electrolytes freeze) but the overall cell voltage would be sufficiently lower than at room temperature thus lowering energy capacity.