Table 2: Salient features of difference anode, cathode and electrolyte materials

Material	Advantages	Disadvantages	References
Anode materials			
Li	• High theoretical capacity ~ 3860 $mAh.g^{-1}$ • Low electrochemical potential (-3.04 V)	• Uncontrollable dendritic Li growth • Low Coulombic efficiency	(Ohtsuka, 1989) (Ohtsuka, 1990)
V_2O_5	• Theoretical capacity of V_2O_5 is as high as ~ 290 $mA{\cdot}h.g^{-1}$ • Feasibility of reversible insertion and extraction of lithium ions • Low cost	• poor stability • Low ionic and electronic conductivity	(Nakazawa, 2005) (Nakazawa, 2007) (Baba, 2003)
Al	• Theoretical capacity of ~ 2235 $mAh.g^{-1}$	• Short cycle life& large volume • High irreversible capacity loss	(Gong, 2015)
Si	• Highest theoretical capacity ~ 4200 $mAh.g^{-1}$	• Large volumetric changes • Large electrochemically created stress • Early capacity fading	(Tong, 2014) (Polat, 2015) (Polat, 2016)
Cathode materials			
$LiCoO_2$	• High theoretical capacity ~ 274 $mAh.g^{-1}$. • Theoretical capacity ~ 170 $mAh.g^{-1}$. • Long cycle life. • Easy operation at high temperature • Low self-discharge	• Expensive • Low thermal stability	(Wang, 1995) (Whitacre, 2001) (Hayashi, 2007) (Kuwata, 2010) (Jacke, 2010)
$LiNiO_2$	• High theoretical capacity ~ 275 $mAh.g^{-1}$. • High energy density.	• Thermally unstable Blocking of Li^+ ion pathways during process.	(Kim, 2002)
$LiNi_xCo_yMn_zO_2$	• High theoretical capacity ~ 280 $mAh.g^{-1}$. • Good cycle stability and low cost		(Kim, 2002) Wang, 2017) (Kun, 2017)
$LiFePO_4$	• Theoretical capacity ~ 170 $mAh.g^{-1}$. • Thermal stability • High power capabilities	• Low operating voltage ~ 3.2V. • Low ionic and electronic conductivity.	(Xie, 2009) (Bajars, 2011) (Alexis, 2016)
$LiMnPO_4$	• Theoretical capacity ~ 170 $mAh.g^{-1}$. • Operational voltage ~ 4V. • High specific energy	• Low ionic and electronic conductivity.	(Baba, 2001) (Park, 1999)
$LiCoPO_4$	• Theoretical capacity ~ 165 • High operational voltage ~ 4.2V.	• Expensive • Low ionic and electronic conductivity.	(Li, 2006) (Li, 2008)
Electrolyte materials			
LiPON	• High ionic conductivity ~ 3.3 x 10^{-6} S/cm. • Excellent electrochemical stability. • High operational potential ~ 5.5V		(Bates, 1992) (Yu, 1997) (Vereda, 2002) (Kim, 2008)
$Li_{10}GeP_2S_{12}$	• Highest ionic conductivity ~ 12 m $S\text{-}cm^{-1}$		Noriaki (2011)
$Li_2S\text{-}P_2S_5$	• High ionic conductivity ~ 2 x 10^{-6} S/cm.	• Electrolyte instability • Large increase in cell resistance	(Kbala, 1984) (Yamashita, 1996)
LVSO	• Ionic conductivity ~ 2.5 × 10^{-7} S/cm. • Electronic conductivity ~ 10^{-10} S/cm	• Low voltage window around 3.5 V	(Yamashita, 2001) (Kawamura,2004)
LLTO	• Highest ionic conductivity of 10^{-3}	• Highly unstable	(Kitaoka, 1997)