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The polypropylene membrane modified by an atmospheric pressure plasma jet as a separator for lithium-ion button battery

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1 **The polypropylene membrane modified by an atmospheric pressure**
2 **plasma jet as a separator for lithium-ion button battery**

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12 **Abstract**

13 The plasma modification of the polypropylene (PP) membrane as a separator in
14 lithium-ion battery (LIB) has been reported in this paper. Specifically, a commercial
15 PP separator was modified by an atmospheric pressure glow discharge plasma jet
16 (APGD-PJ) with the acrylic acid (AA) monomer. The morphology, electrolyte uptake
17 and retention, the pore size distribution, and the electrochemical properties of the
18 modified PP separator were analyzed. The experimental results indicate that the AA
19 polymer (PAA) was uniformly coated on the surface of the PP membrane, and the
20 contact angle of modified PP was reduced from 112° to 39° using He/O₂/AA plasma
21 and the electrolyte uptake of the modified PP separator increased to above 300% of
22 the value of the unmodified one. Compared with the original PP, the cells assembled
23 with the PP separator modified with Ar/O₂/AA or He/O₂/AA plasma showed higher

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