

## 전기 이중층 커패시터 적용을 목적으로 한 공용매상 전해액과 전기화학적 특성

## Enhance Potential Stability of Organic Electrolyte in EDLC by Using Co-solvent and Its electrochemical properties.

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**초 록:** Characteristics of electrolyte are those; electrical stability, ion conductivity, viscosity, high temperature work, cell application. Theoretically, GBL has high oxidation voltage. Also, boiling point of GBL is 206°C and flash point is over 280°C.

## 1. 서론

Electrochemical double-layer capacitor(EDLC) is on a rise as a kind of Energy storage system(ESS), nowadays EDLCs work by physical charge and discharge electrons at double-layer (also known as Helmholtz layer). Therefore, EDLCs have high power density and long cycle life, but energy density is very low. The internal structure of EDLCs are consist of cathodic/anodic electrode, electrolyte and separator for prevention of short.

## 2. 본론

Among of them, electrolyte is influence at internal resistance of EDLCs. Because of electrolytes were composed solvent and electrolytic salts. So, we need to consider characteristics of solvent and salts. Characteristics of electrolyte are those; electrical stability, ion conductivity, viscosity, high temperature work, cell application. Before papers are almost suggest linear structure carbonate as additives like DEC, DMC, etc for PC, EC or AN-based electrolyte. But they don't have salt solubility.

In this study, we experiment co-solvents for electrolyte in EDLCs. Especially, we focused on the cyclic structure solvents addition. Co-solvent was used Propylene Carbonate(PC), Tetrahydrofuran(THF),  $\gamma$ -Butyrolactone (GBL). Furthermore, we applied electrolyte samples to EDLC cell. THF and GBL addition shows low viscosity than pristine PC. By using THF and GBL, PC-based electrolyte can decrease ionic conductivity. But THF has not enough electrical stability. In LSV results, yield point was decreased by THF oxidation. Theoretically, GBL has high oxidation voltage. Also, boiling point of GBL is 206°C and flash point is over 280°C. So, GBL addition is enlarge non-flammable properties.

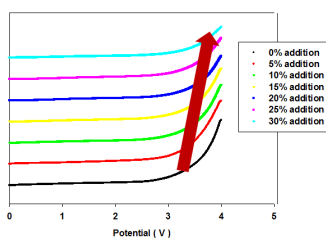


Fig. 1. Enhanced voltage range by PC added percentage.

## 3. 결론

First, Ion conductivity was observed. To suggest colligative property, ionic conductivity was measured by concentration. Measuring LSV, current plateau area was detected that the area is stable potential range. GBL and PC addition gives electrical stability to cell application shows overall effects at the electrolyte in EDLCs.

## 참고문헌

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