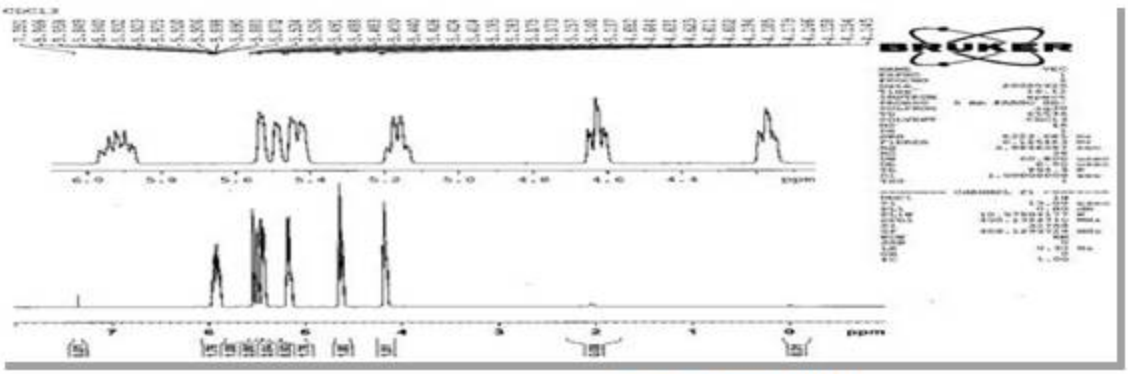
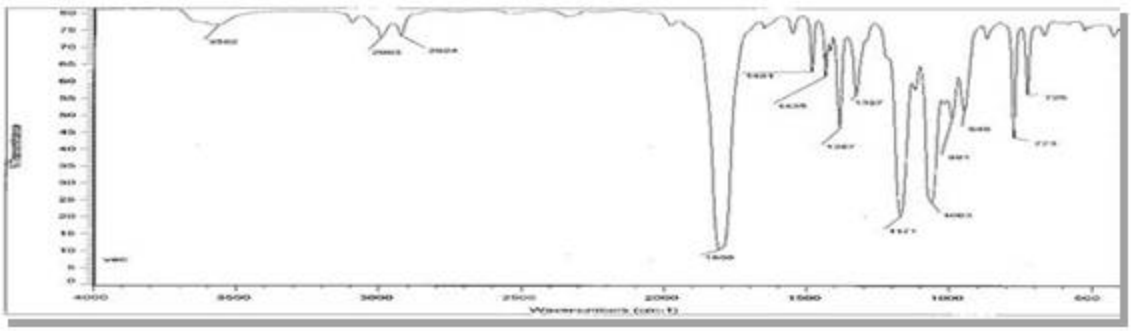
Property introduction of VEC

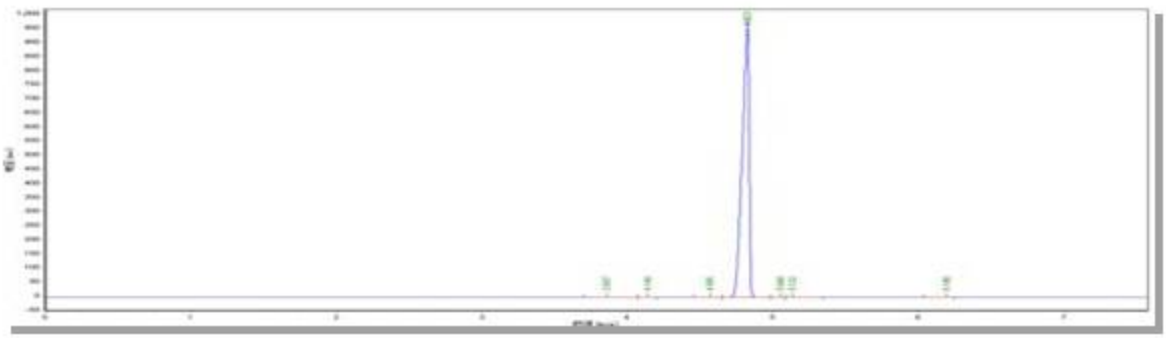
By using technologies of isomerization, catalytic transesterification, etc. we synthesized Vinyl Ethylene Carbonate (VEC) successfully. Purity is no less than 99.6% and water is no more than 28.1 ppm. It's commercially available now.



- VEC spectrum of NMR



- VEC spectrum of IR



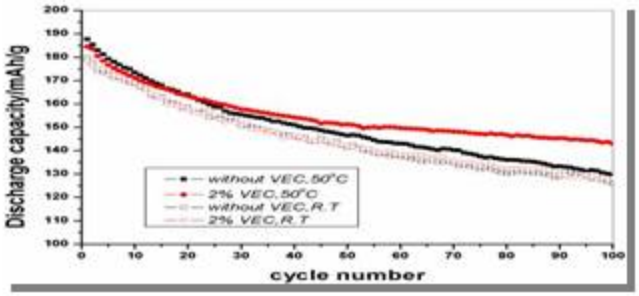
- VEC spectrum of GC (purity: 99.82%)

Together Everyone Achieve More

Recent decades, many literatures reported that properties of electrochemistry had been improved apparently when a little unsaturated carbonate was added into the nonaqueous electrolyte solution. For example, Vinylene Carbonate (VC) had been used as an electrolyte additive, because it could form the Solid Electrolyte Interphase (SEI) on the surface of anodes. However, Vinylene Carbonate (VC) cannot be stable enough, which restricts its application.

Recently, Vinyl Ethylene Carbonate (VEC) is a hot topic for the reason that the structure of Vinyl Ethylene Carbonate (VEC) is more stable than VC's. Thanks to multiple electron bonds exist in VEC and the much potential to cut the cost compared to other electrolyte additives, many researchers believe VEC as an additive will improve the electrochemical properties in Lithium Ion Battery (LIB) significantly, especially in the electrolyte based on Propylene Carbonate (PC), and have a wide application.

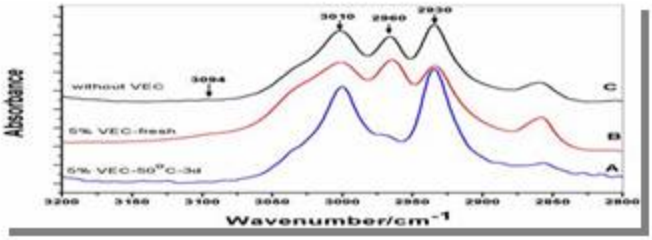
Our company, cooperating with the Electrochemical Engineering Center of Nanjing University, carried on the electrochemical property research of VEC. The trial demonstrated that cyclic performance of anode metal $LiNi_{0.8}Co_{0.2}O_2$ was improved significantly after putting 2% VEC into the electrolyte of $LiPF_6$/EC+DMC at 50℃ high temperature.



• Cyclic performance of anode $LiNi_{0.8}Co_{0.2}O_2$ at different temperatures and in different electrolytes

From the figure, we can see the discharge capacity was improved from 68.8% (black line) to 84.8% (red line) at the presence of VEC after 100 times charge-discharge cycling. Please note that the discharge capacity of battery is still high at the 100 times cycling after VEC was added at 50℃, which indicates that VEC has a good high temperature performance.

According to the test result below, the CO_2 peak disappears (A line) at the second charge-discharge cycling when 5% VEC was added at 50 ℃ and the release quantity of CO_2 decreases markedly, which shows that Solid Electrolyte Interphase (SEI) has been formed on both anode and cathode surface at the presence of VEC.



• FTIR in different electrolytes