The climatic chamber and measurement device is illustrated in figure 2 and figure 4. The figure 3 (print circuit board) is designed for the test circuit based on the schematic(figure 1).

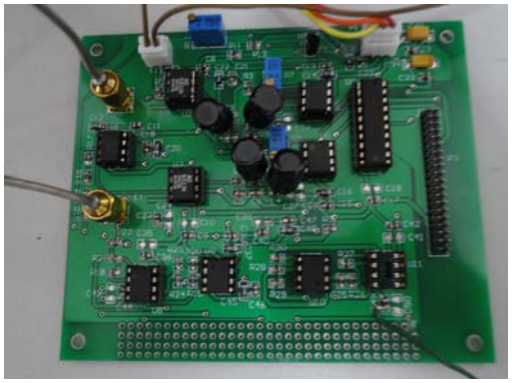

Figure 3. The printed circuit board we designed for experiment

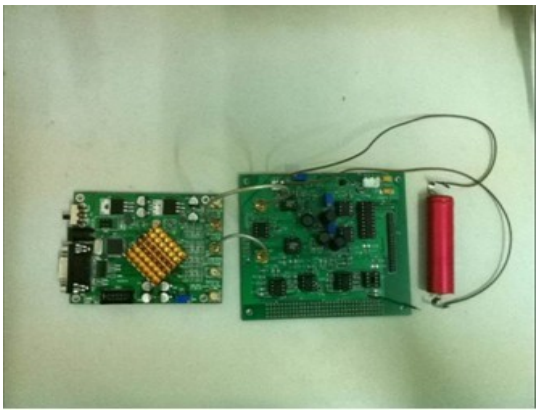

Figure 4. Climatic chamber and measurement device

The experiment result is shown in figure 5. We plot the data with a program which was written with Python language. Python is an object-oriented, dynamic programming language, which has a very simple and clear syntax. With the development of the Numpy, Scipy, Matplotlib, and so many modules, python becomes more and more suitable for scientific computing, draw 2D, 3D image effectively. Python is a general-purpose programming languages. Compare to the Matlab, it's widely used in many areas.

We represent the experiment result in the figure 5, as we see, there are three different kinds of curves, The solid line's source signal is 10MHZ, the dashed line is 5MHZ, and the dotted line is 1MHZ. From figure 5, we can see that the dielectric loss angle is in proportion to the voltage difference to some extent.

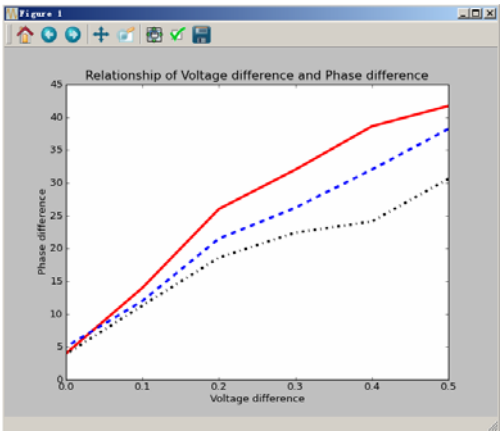


Figure 5. The relationship of voltage difference and phase difference

## IV. CONCLUTION

In this paper, we have presented the new method predicting the SOC of Lithium-ion battery based on measuring the Dielectric loss angle. The experiment result illustrated that the SOC of Lithium-ion battery is in proportion to the Dielectric loss angle of internal medium to some extent. This explains that we can take measurement on the dielectric loss angle to predict the SOC of battery. In contrast to various traditional methods, the method in this paper is more accurate and can monitor the battery online. This provides a new method for monitoring the SOC and SOH of lithium-ion batteries. Further studies are needed to see whether this approach is suitable for different kinds of batteries, and whether it is accurate enough to be used in monitoring SOH and SOC of Lithium-ion batteries online.

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