



Preliminary Experimental Research on Electrical Resistivity of Polyimide Film under High Pressure

Chaohu Yu¹, Yewen Zhang^{1*}, Tianhu Lv¹, Jian Shi², Yabo Sun³, Longhua Mu¹, Xuan Wang², Yang Xu³, Qingquan Lei²

*corresponding author: yewen.zhang@tongji.edu.cn

¹Department of Electrical Engineering, Tongji University, Shanghai, 201804, China;

²Harbin University of Science and Technology, Harbin, 150006, China;

³State Key Laboratory of Electrical Insulation and Power Equipment, Xi'an Jiaotong University, Xi'an, 710049, China

Introduction

■ The basic mechanism of electrical resistivity can be obtained from the relationship between resistivity and pressure. It was difficult to test with the usual three-electrode structure under high-pressure, so the two-electrode system is used to measure the electrical resistivity.

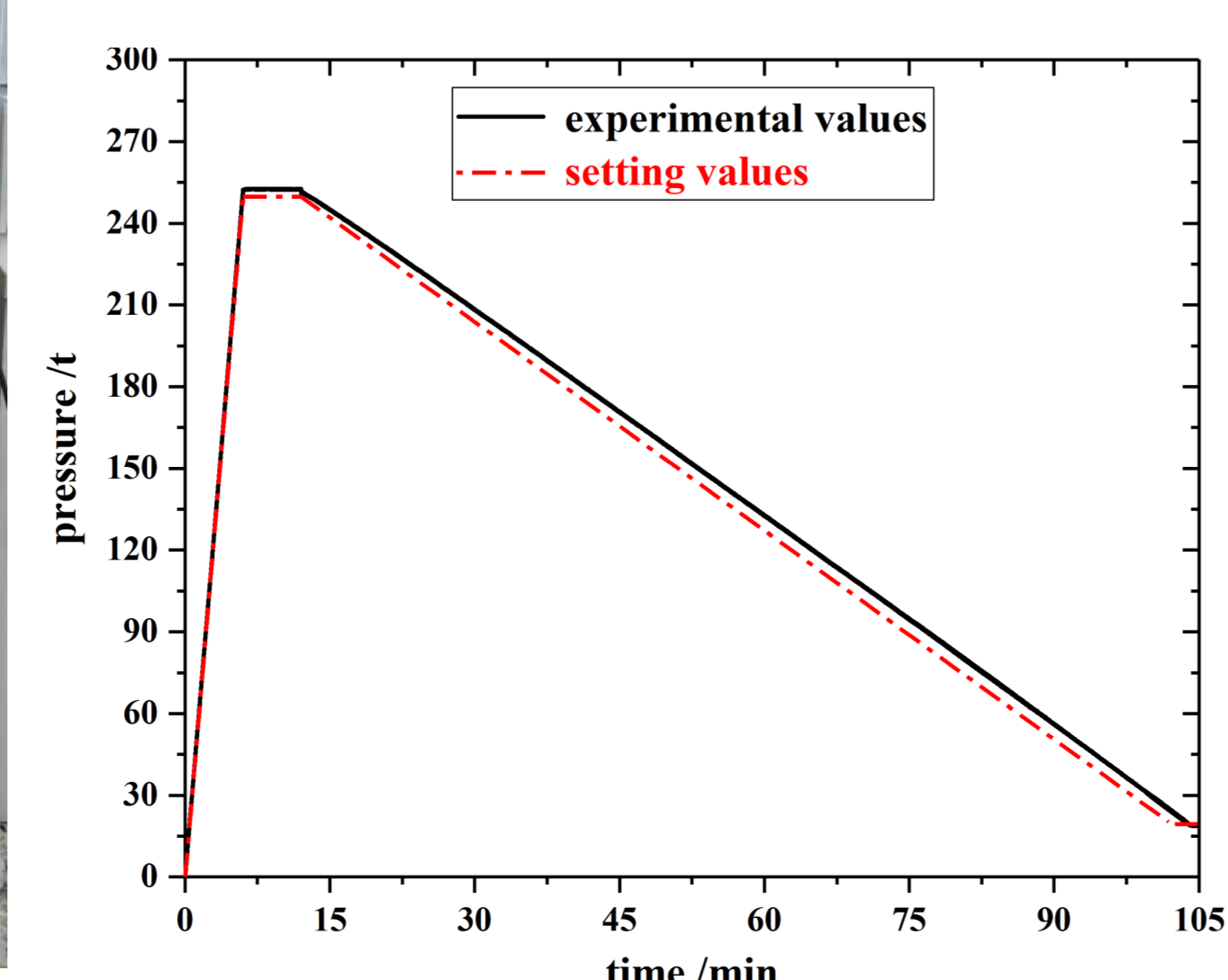
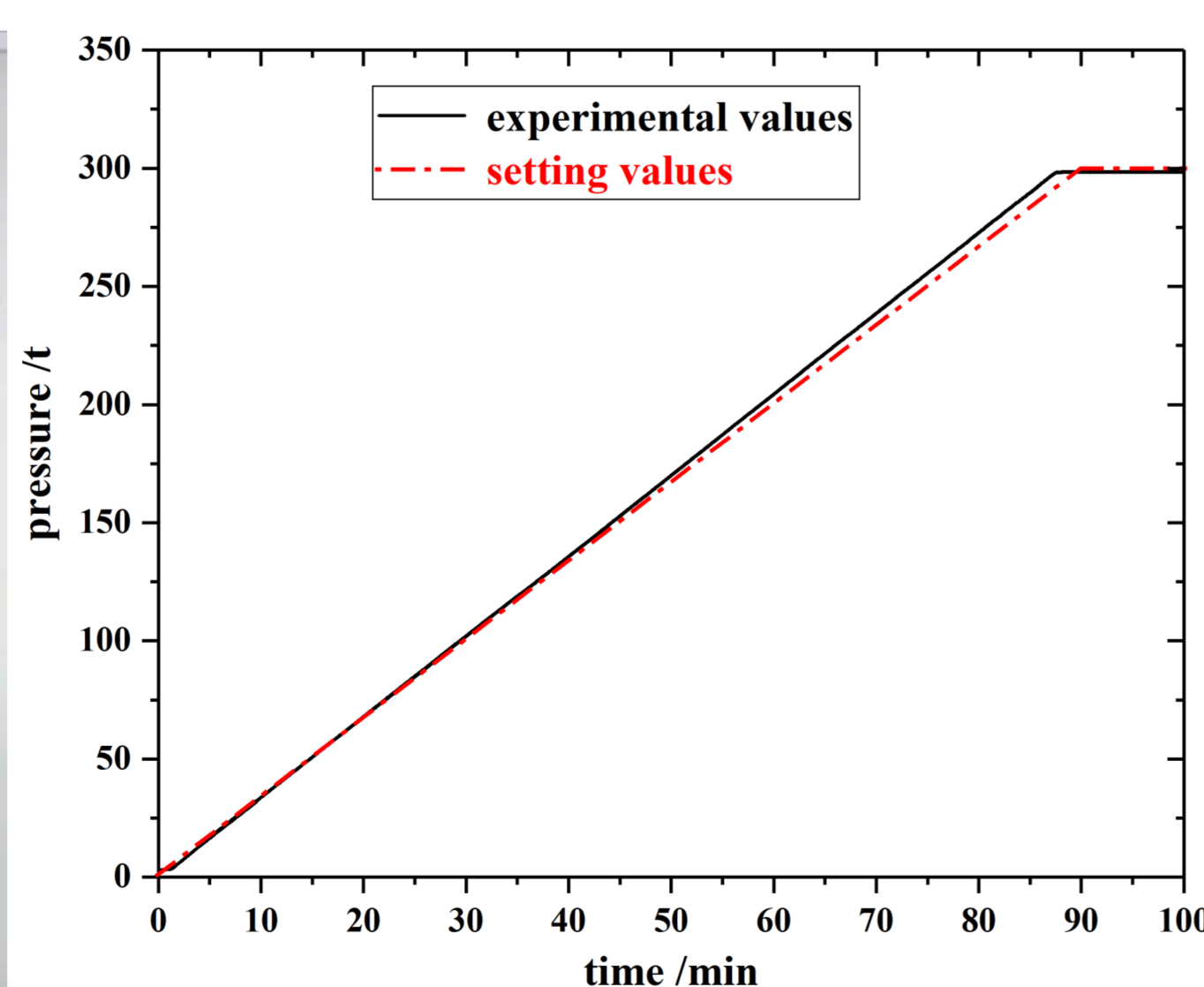
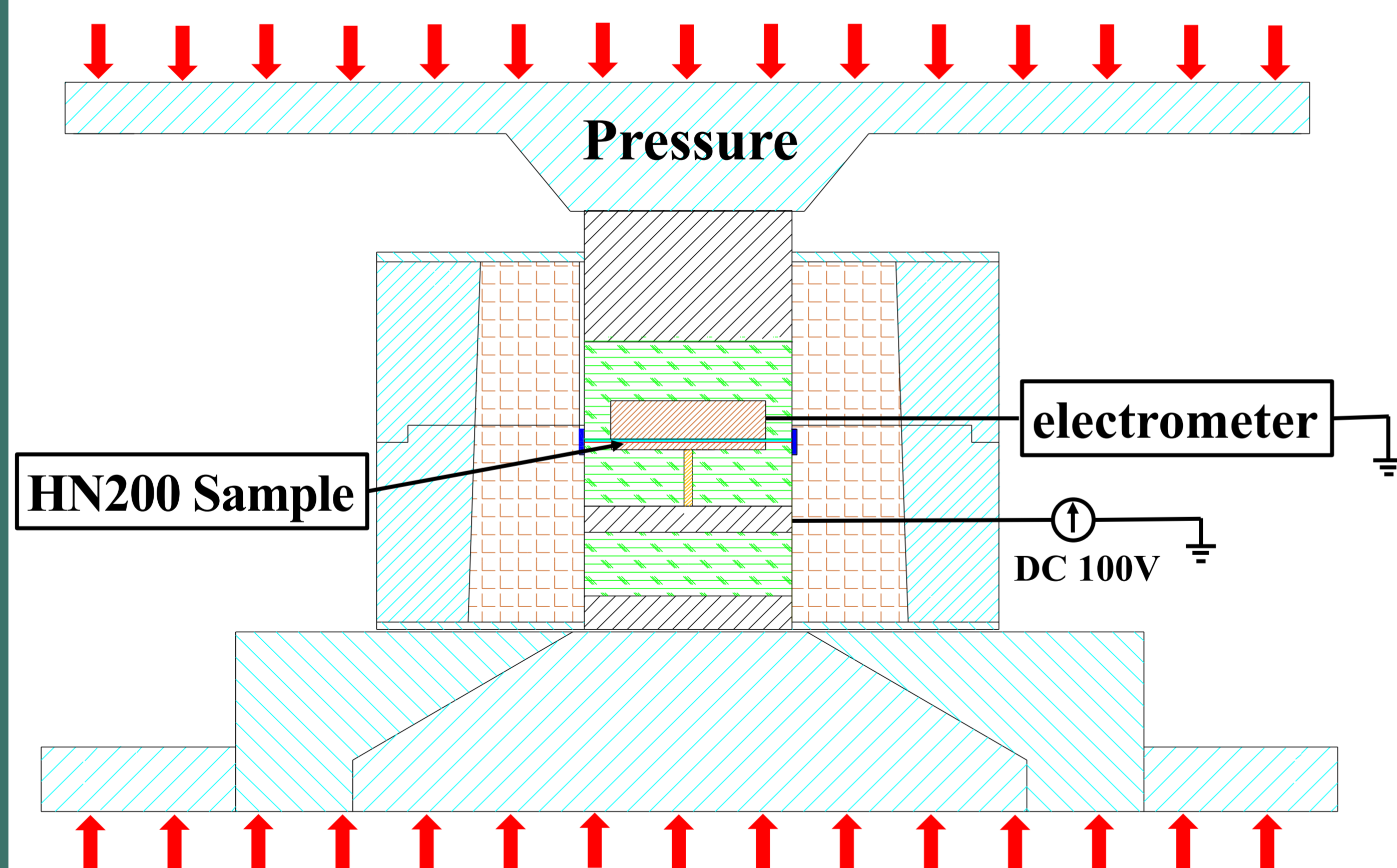
Measurement system

- One electrode of PI film sample is connected to DC voltage, and another is series connected with an electrometer
- The leakage current flowing through PI film samples will be measured by the electrometer
- The electrical resistivity can be calculated from experimental data

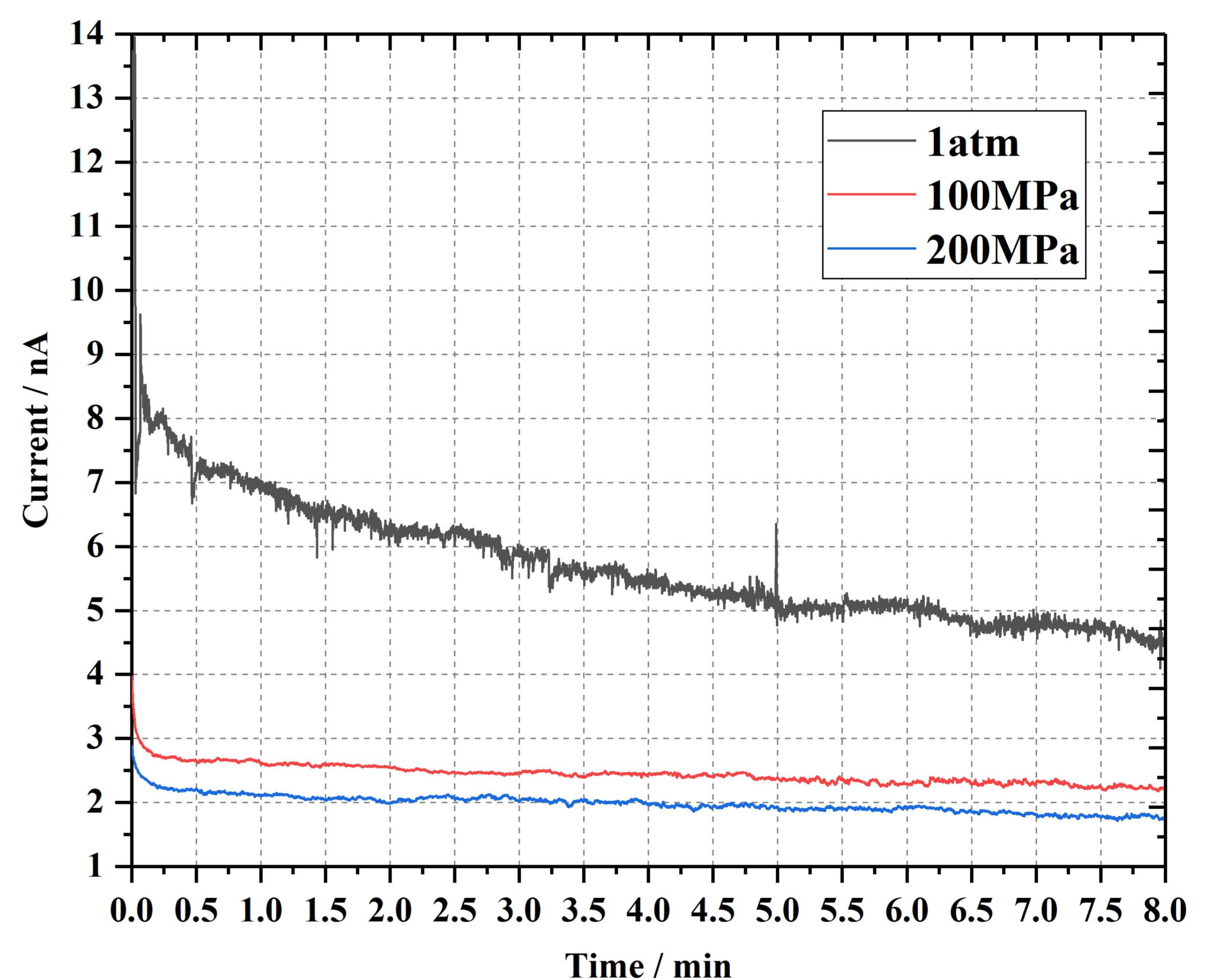
Experimental

High pressure generator

- Using a hydraulic device and a servo control system generate stable high pressure
- The maximum pressure can reach 300 t



Preliminary results



- Leakage current of PI samples under high pressure
- The value of DC voltage is 100 V and the changes of thickness will be ignored

Discussion and Conclusion

- It is acceptable to use two-electrode method to measure the resistivity of insulating materials under high pressure
- At room temperature, the electrical resistivity of PI samples has positive correlation with pressure