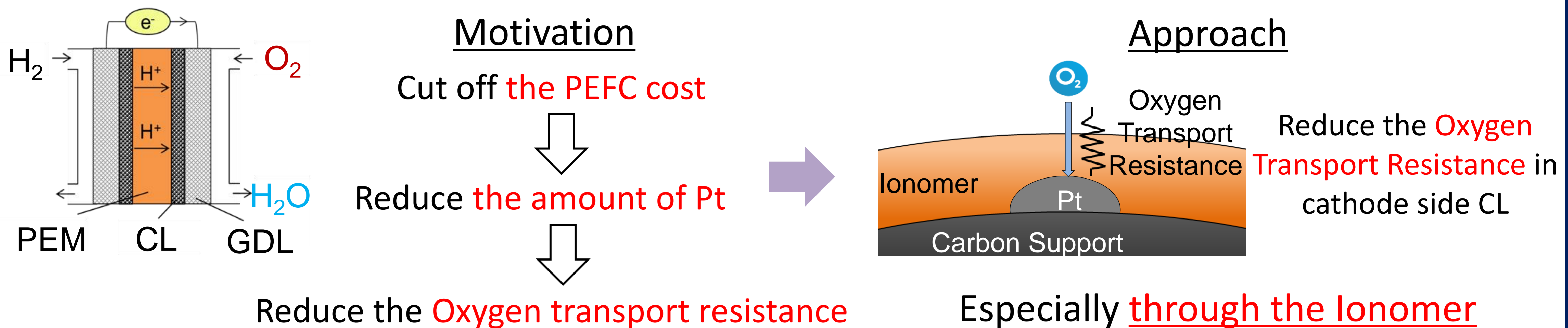


# Development of Graphene-Based PEFC Catalyst Layer for Reduction of Oxygen Transport Resistance

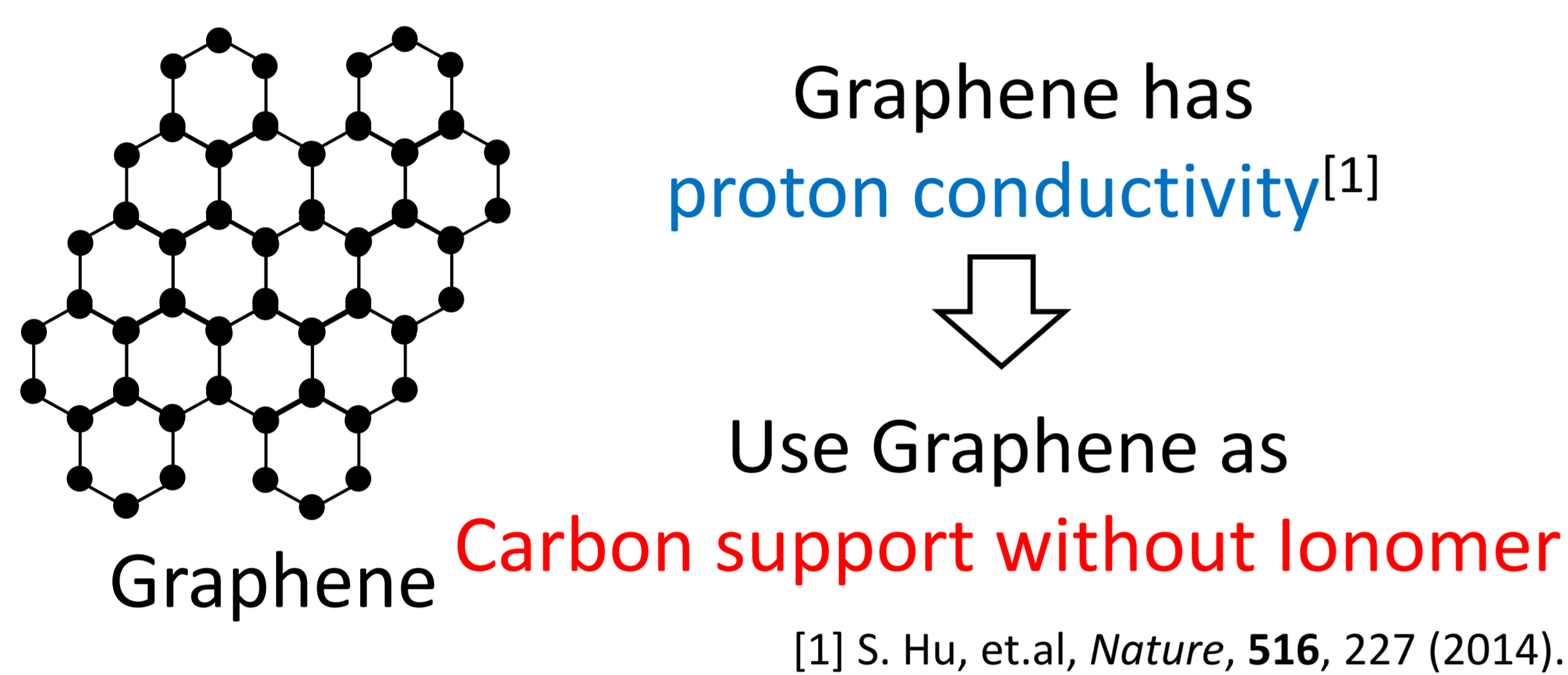
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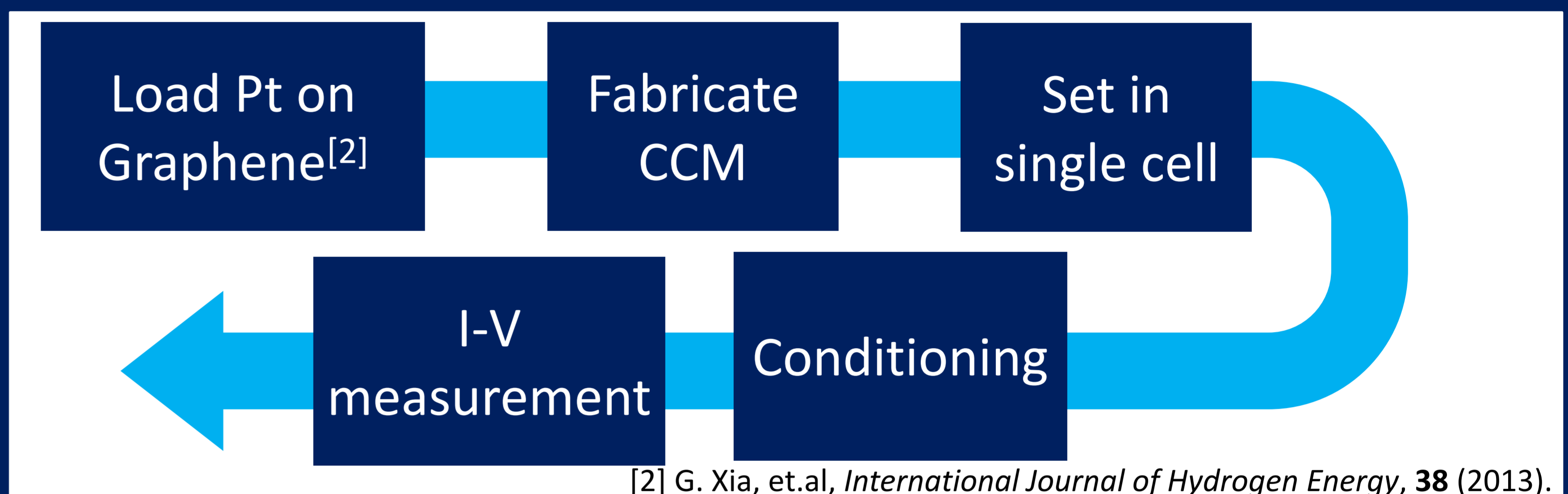
## 1. Introduction



## 2. Graphene to PEFC CL

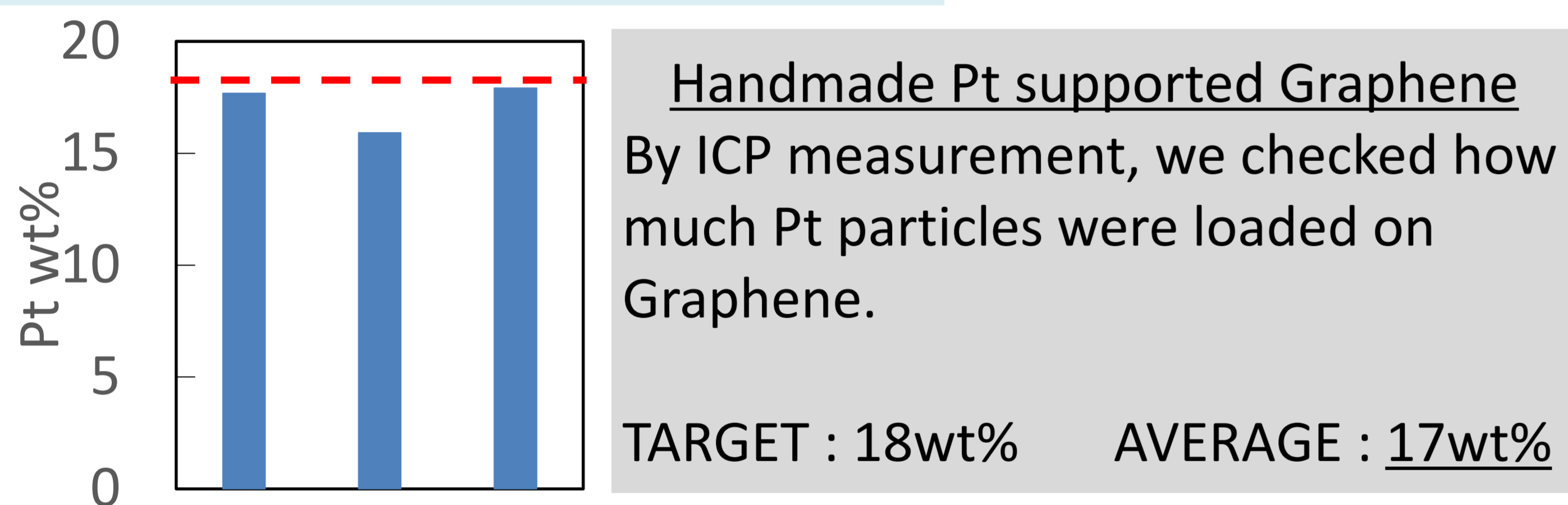


## 3. Experimental procedure

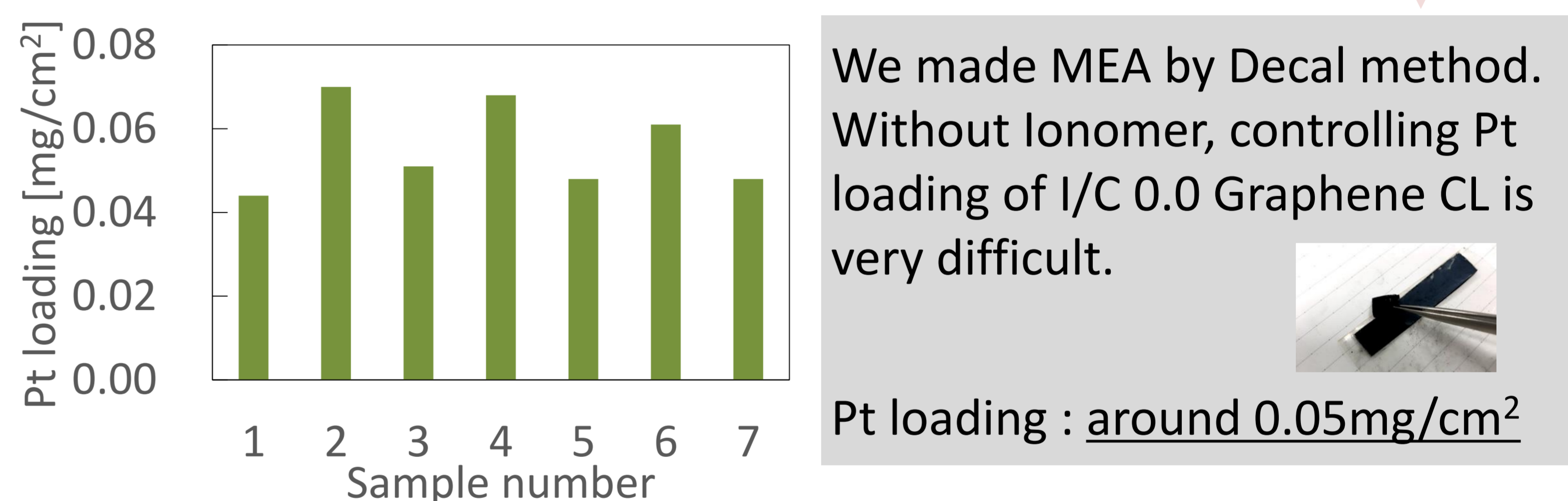


## 4. Results and discussions

### Evaluation of Pt wt% on Graphene



### Low Pt loading of I/C 0.0 Graphene-based CL

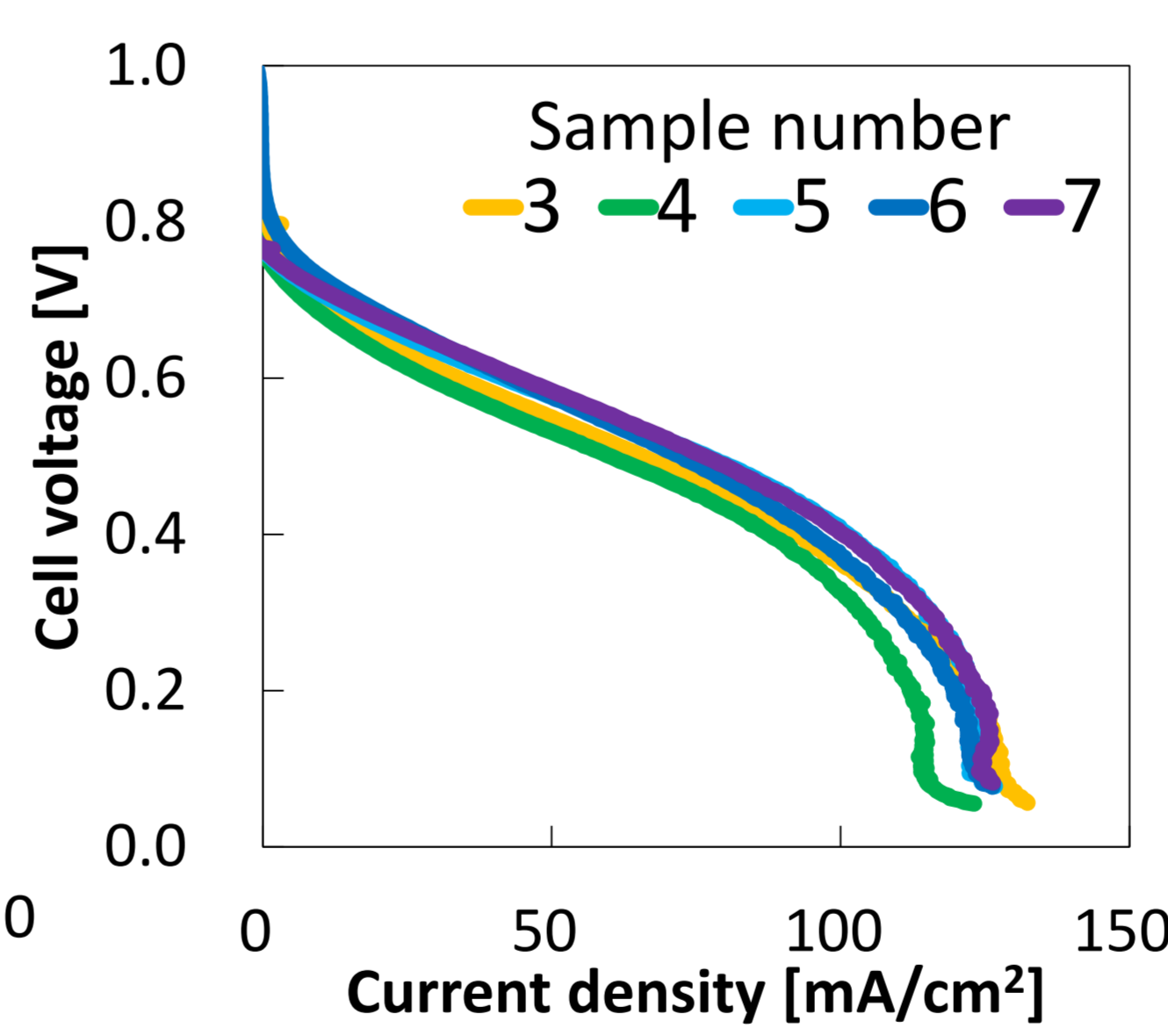
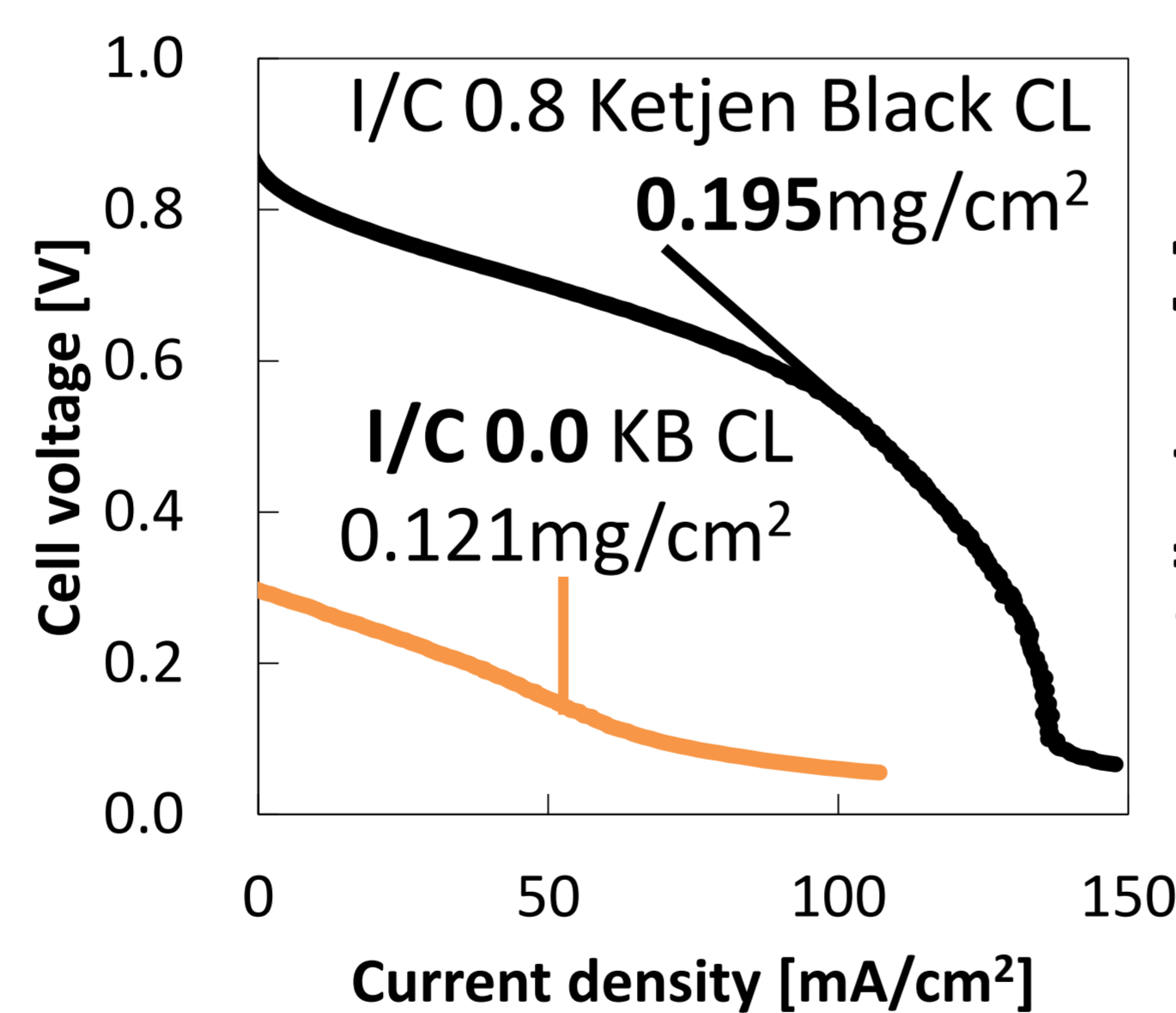


### Experimental condition

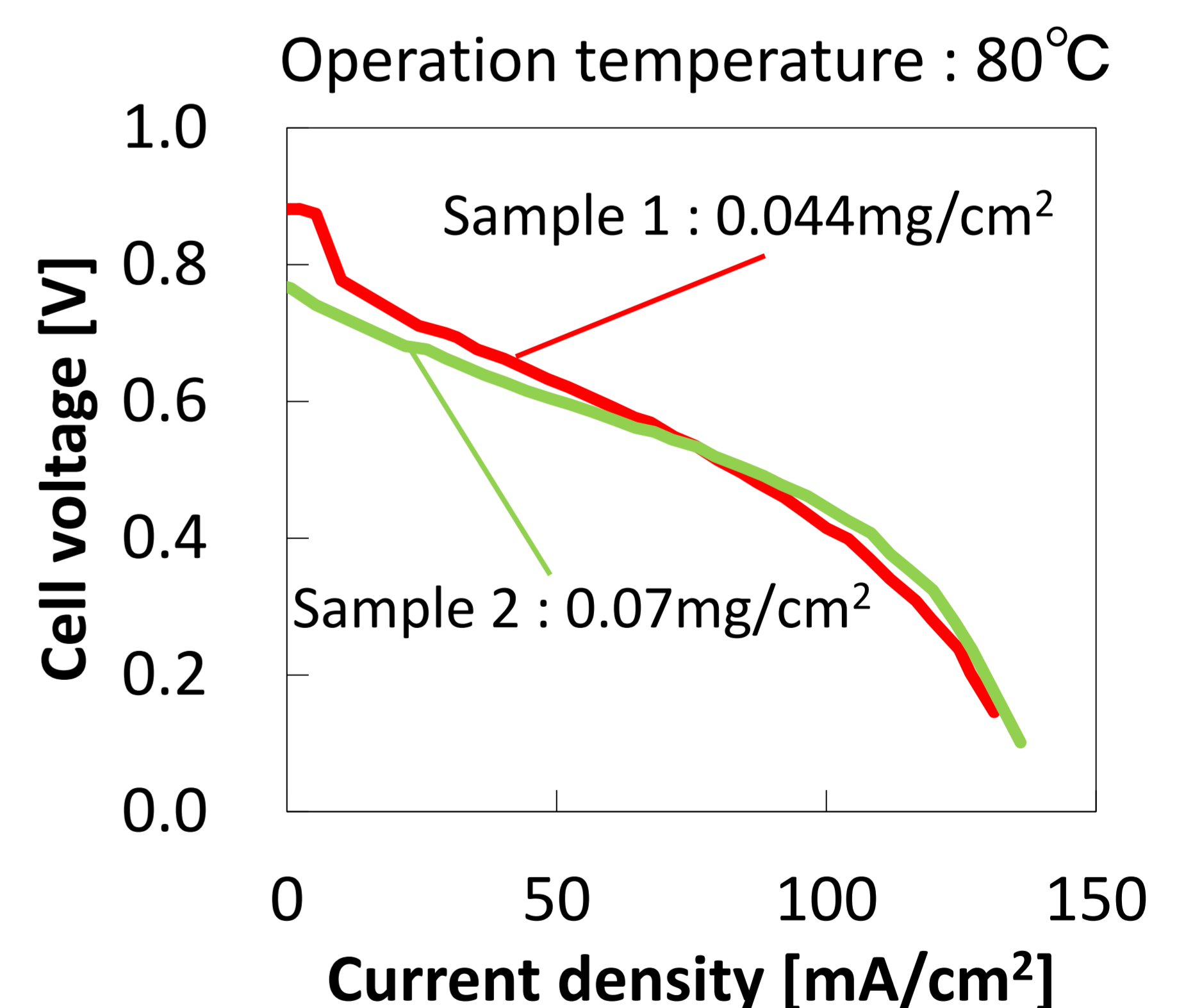
Anode		CL (1x5cm <sup>2</sup> )	
Gas	H <sub>2</sub> : 100 %	I/C	0.8
Flow rate	: 0.1 L/min	Pt loading	: 0.2mg/cm <sup>2</sup>
RH	: 80%	Carbon	: Ketjen Black

Cathode	
Gas	O <sub>2</sub> : 1 %
Flow rate	: 2.0 L/min
RH	: 80%



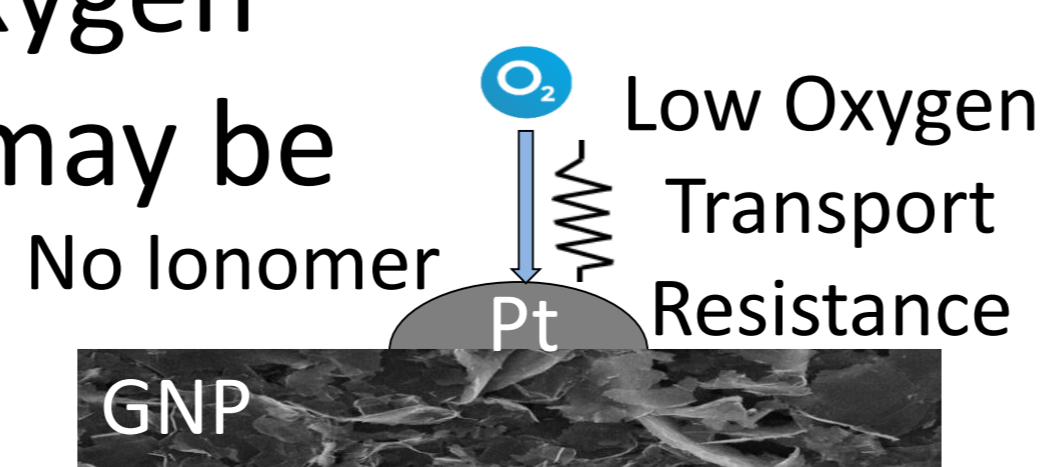
### Measurement of I-V curves



Graphene-based CL can generate electricity **WITHOUT IONOMER**.  
And these I-V performances were close to that of I/C0.8 KB CL 0.195mg-Pt/cm<sup>2</sup>.  
These results indicate that Graphene is beneficial material for reducing amount of Pt.

## 5. Conclusions and future work

- ▶ Graphene has ability to generate electricity without ionomer.
- ▶ Graphene would be good material for reducing the amount of Pt in PEFC, because the oxygen transport resistance near the Pt surface may be reduced drastically.



- ▶ The surface of Graphene CL is not smooth and its shape and Pt loading are different from one by one. This point is one of the reason that I-V performance varies. Improving this point will enhance the performance of Graphene based CL, and there are much room of reducing the amount of Pt.