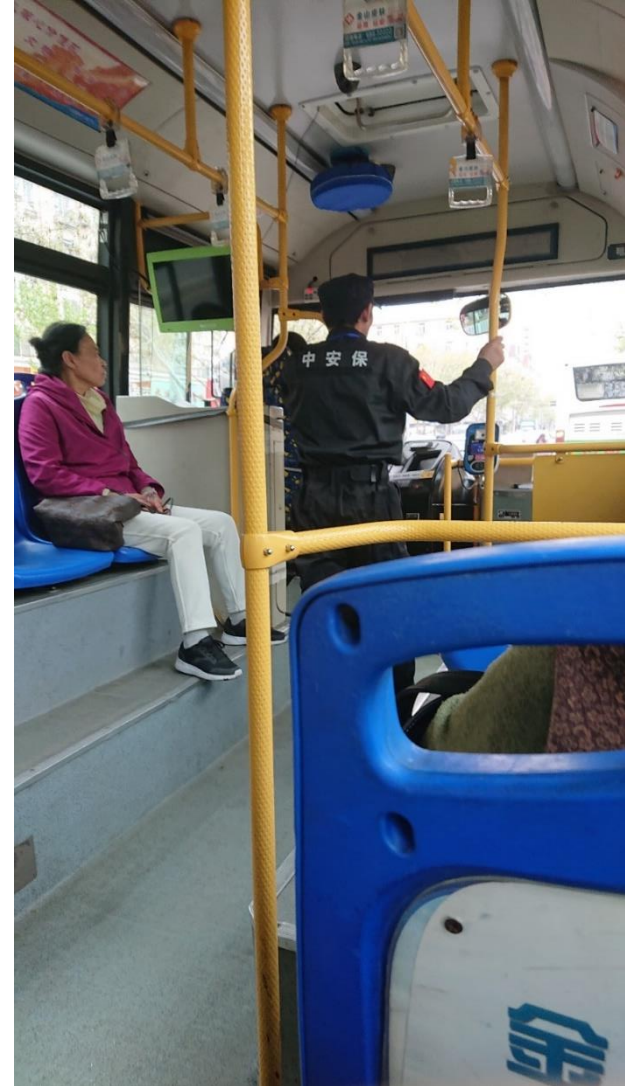




The 7th International Symposium on Micro and Nano Technology (青島)

報告者: 陳禹霖







國立中央大學
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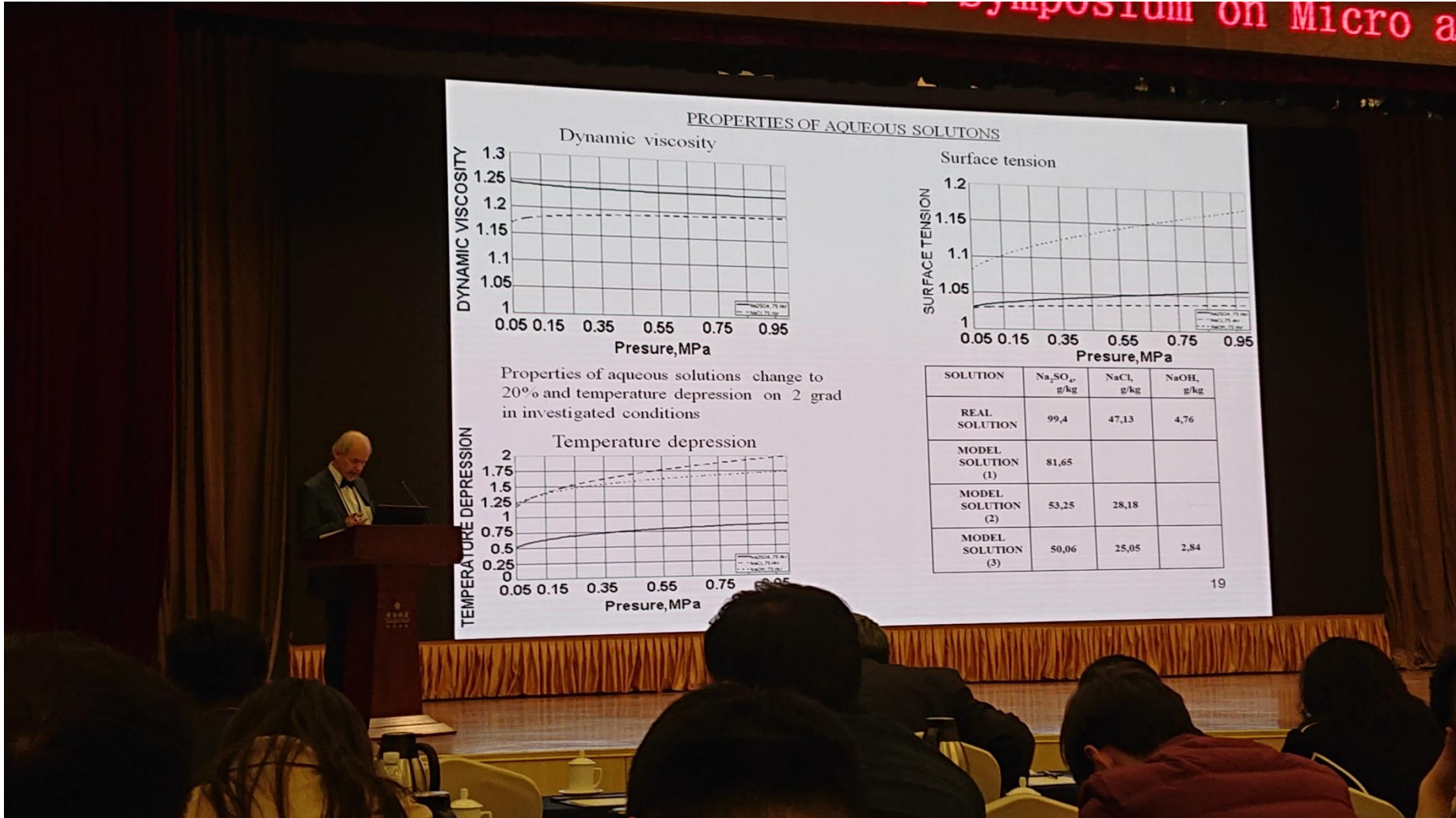
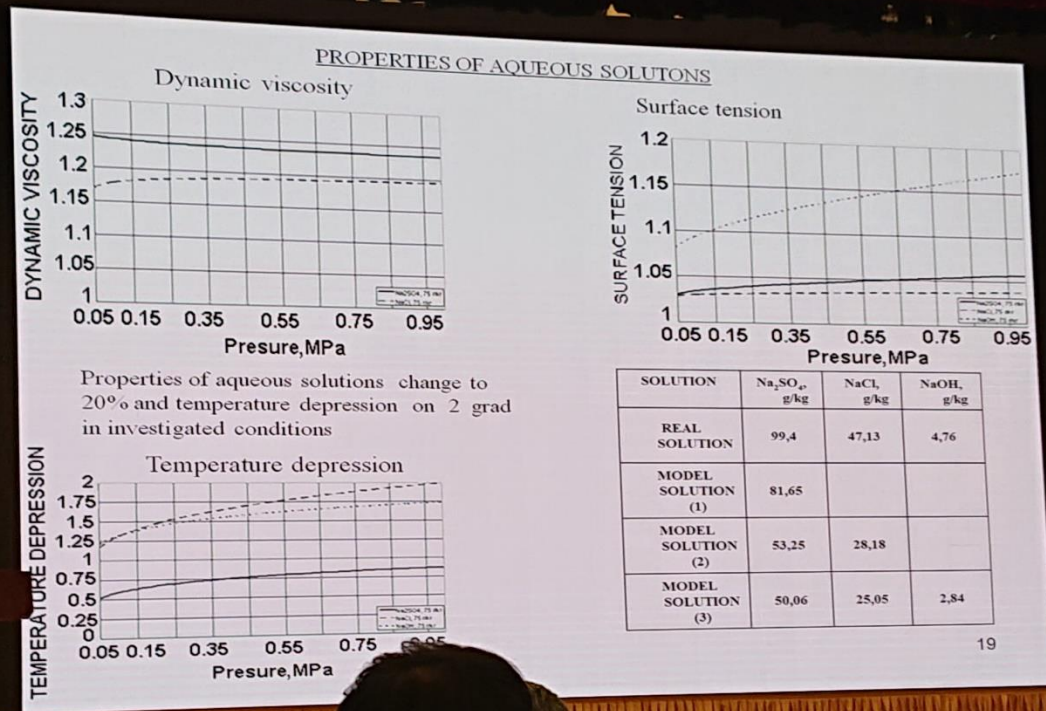
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Effect of Graphene Coatings on Pool Boiling and Condensation Heat Transfer

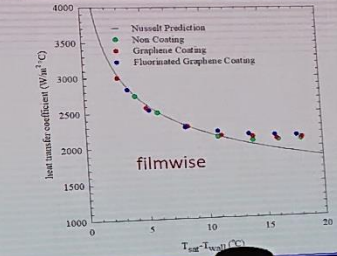
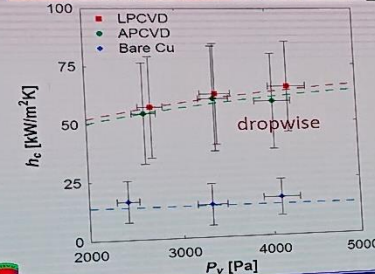
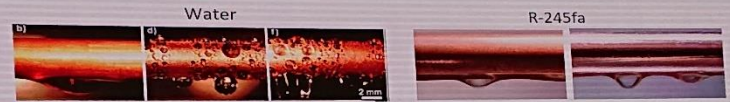
Chien-Yuh Yang

Ching-Yuan Su, Bo-Wei Jhang, Yu-Lin Chen and Cheng-Chun Huang

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Water Comparing to Refrigerant

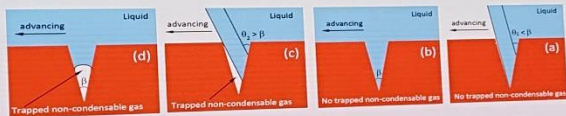


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Advancing Liquid Line on a Cavity

- Consider an initially dry surface is flooded with liquid.
- (a) If the liquid-surface contact angle θ_1 is smaller than the cavity apex angle β , non-condensable gas will not be trapped in the cavities (b), and this cavity cannot be an active nucleation site.
- (c) If the liquid-surface contact angle θ_1 is larger than the cavity apex angle β , the surface tension force will resist further penetration of the advancing liquid and trap non-condensable gas in the cavities (d).
- Smaller cavities are easier to trap non-condensable gas.

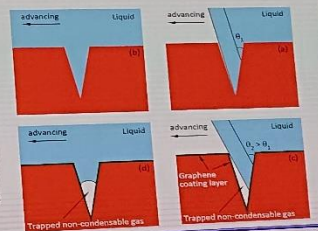
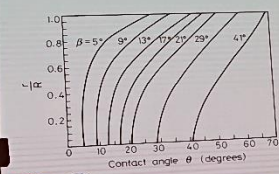


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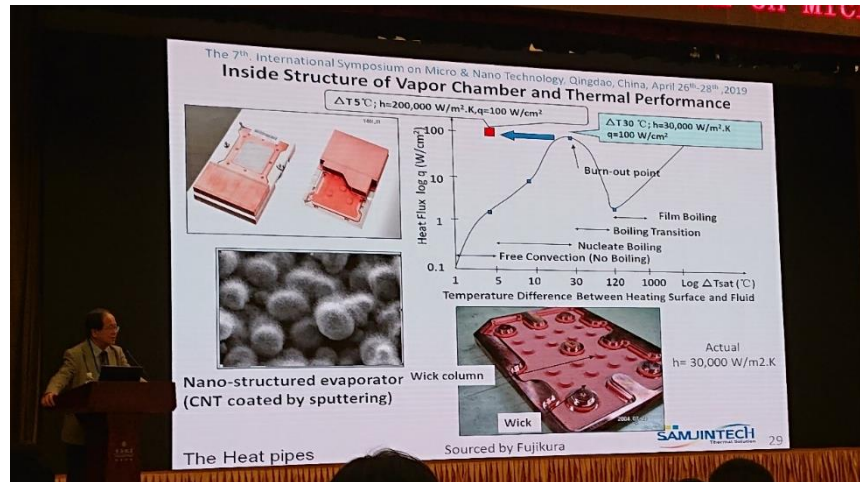
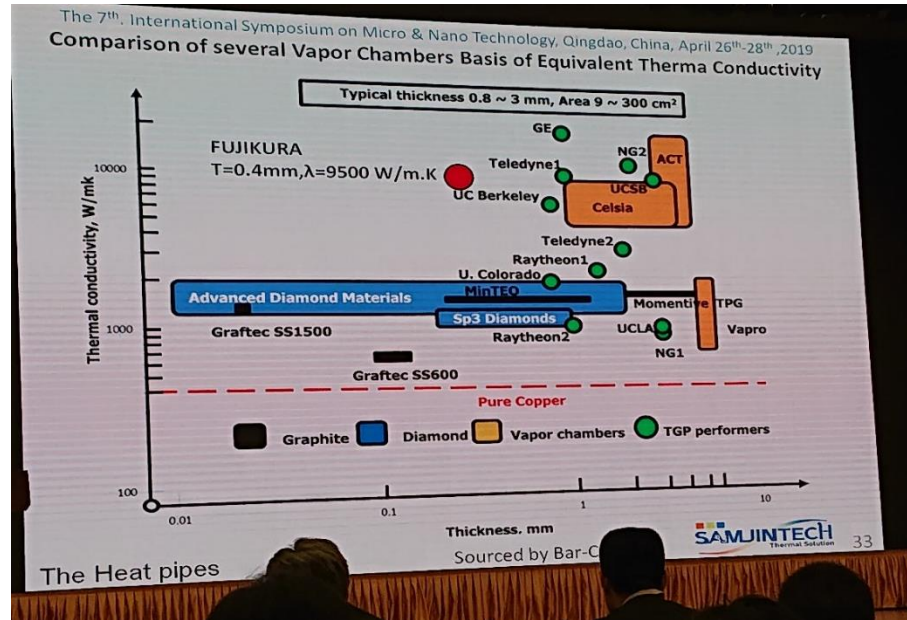
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Motivation of the Present Study

- Graphene coating is able to increase the fluid-surface contact.
- Will this be beneficial for enhancing boiling or condensation heat transfer?



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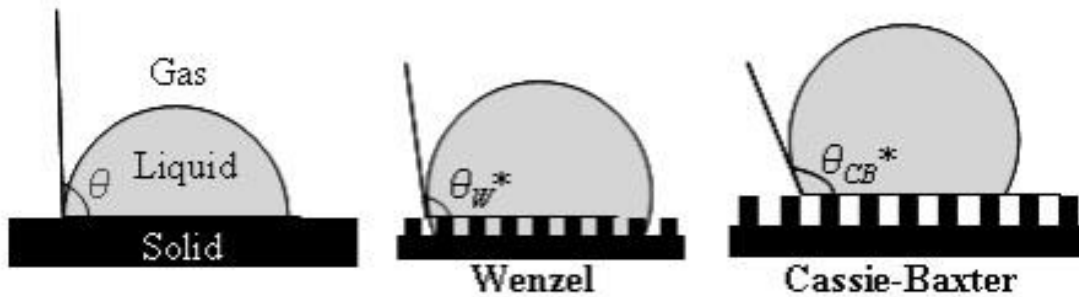
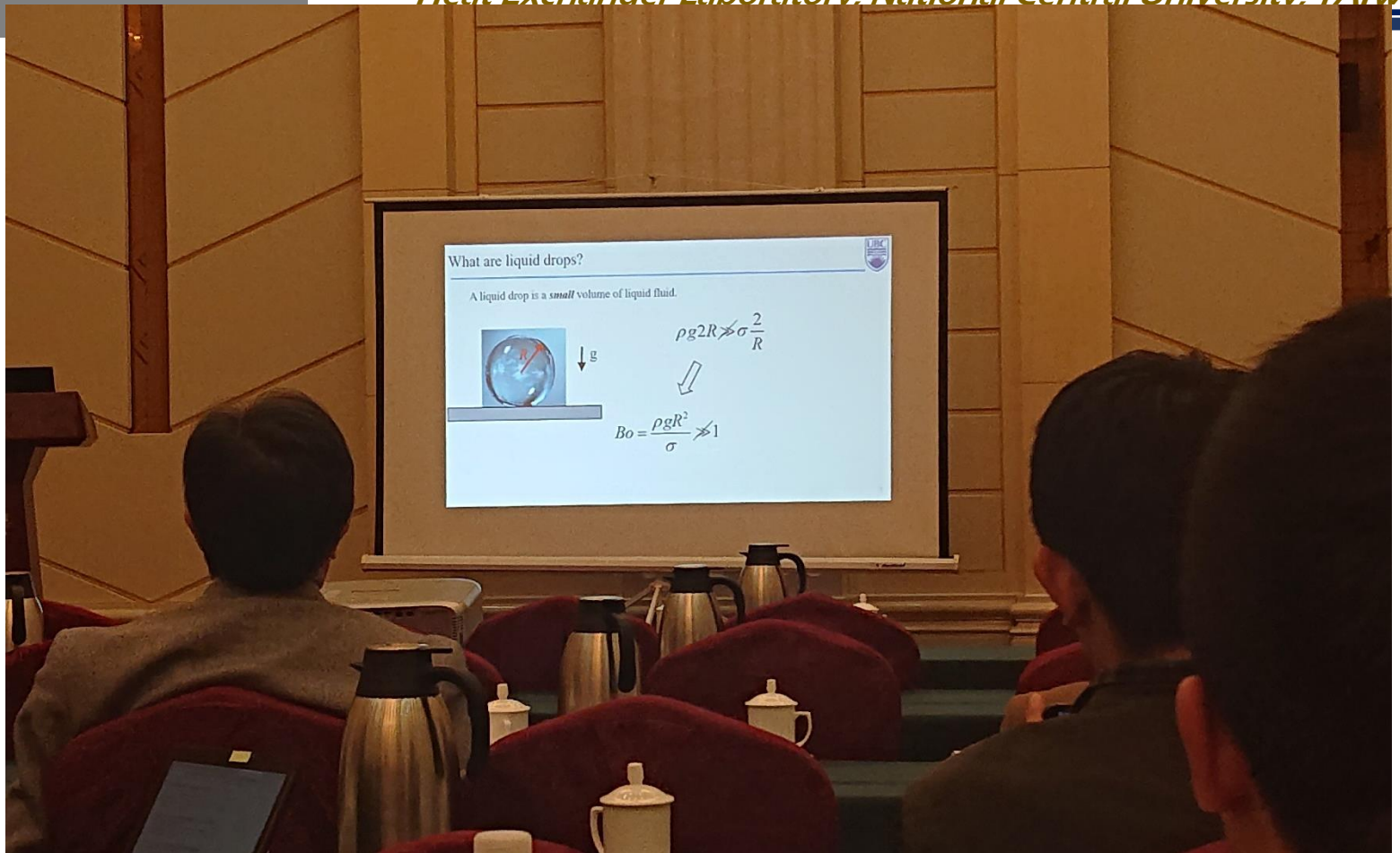




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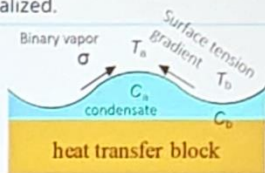




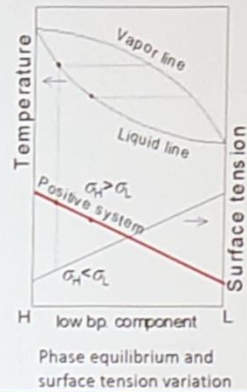


Background
--Marangoni (dropwise) Condensation

- Occurs during the condensation of positive system, e.g. the water-ethanol vapor mixture.
- Dropwise condensation can be realized due to the surface tension gradient induced by concentration gradient.
- Heat transfer enhancement can be realized.



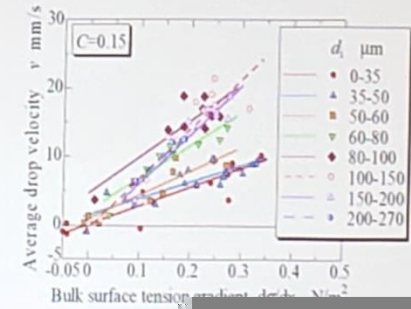
Mechanism of drop formation



Phase equilibrium and surface tension variation

Previous results
--Chen & Utaka, 2011

Drop velocity – surface tension gradient









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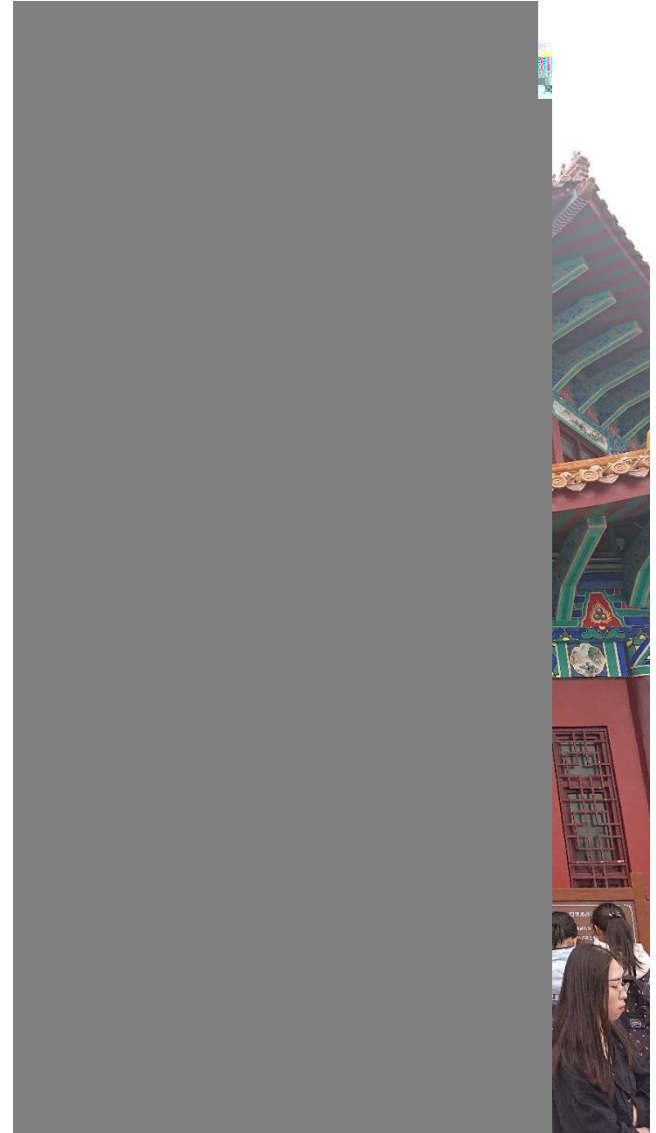




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