Power of SEM AND TEM
—How they’re applied to research

周倩
SEM & TEM review

- **SEM** = Scanning Electron Microscopy
- **TEM** = Transmission Electron Microscopy

- Used to observe the surface of the objects
- Used to find out the internal structure by seeing through the surface
Example of TEM

- **Preparation of Supported Palladium (Pd) Catalyst by Biochemical Method**
  - 生物化学法制备负载型钯催化剂, 傅锦坤等, 2000 Vol.39 No.1 P.67-71, 厦门大学学报（自然科学版）

- **Principle**
  - Strain R08 (Bacillus SP.) (a type of bacteria) has strong adsorbability to Pd2+ and can reduce Pd2+ to Pd0+.
  - This kind of bacteria changes its physiological figures in this process.
• Why choose TEM?
  1. Considerable physiological changes
  2. TEM enables us to note this point according to how it works.

• Conclusion
  • Cell wall has many positions to combine with metal ions due to cell wall components (carbohydrates, protein and lipid).
Example of SEM

- Biological diagnostic and therapeutic study on the infection of helicobacter heilmannii
- 海尔曼螺杆菌感染的生物学与诊断治疗的研究, 陈烨等, 1998 年第 78 卷第 7 期 No.7 Vo.78 1998, 中华医学杂志

- Principle
- Use many methods to study this Hh (Helicobacter heilmannii), compared to another similar species - Hp (Helicobacter Pylori)
- Hp = 幽门螺旋杆菌
Characteristics of Hh in this photograph

1. Larger than Hp: 2~4 times longer and 2 times thicker in diameter

2. More spirals: 3~12

3. No periplasmic fibre, in other words, no fibre around

4. Polar flagella (鞭毛)
• Why use SEM this time?
  1. Physiological features are in need for identification.
  2. External traits are important.

• Result
  • Hh is another bacteria leading to stomach disease.
  • It is different from Hp both in size and shape.
  • The most effective way of recognition is to “watch” it under microscope.
Thanks for your listening!