

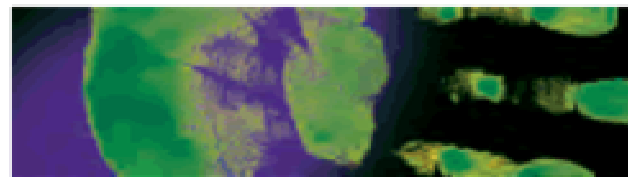
One step to detect the latent fingermarks with gold nanoparticles

D. Gaoa, F. Li , J.Songa, X. Xua, Q. Zhanga, L. Niua, Talanta 80 (2009) 479–483



Latent fingerprints

- **One of the most important categories of physical evidence in the forensic science**
- **Personal identification**



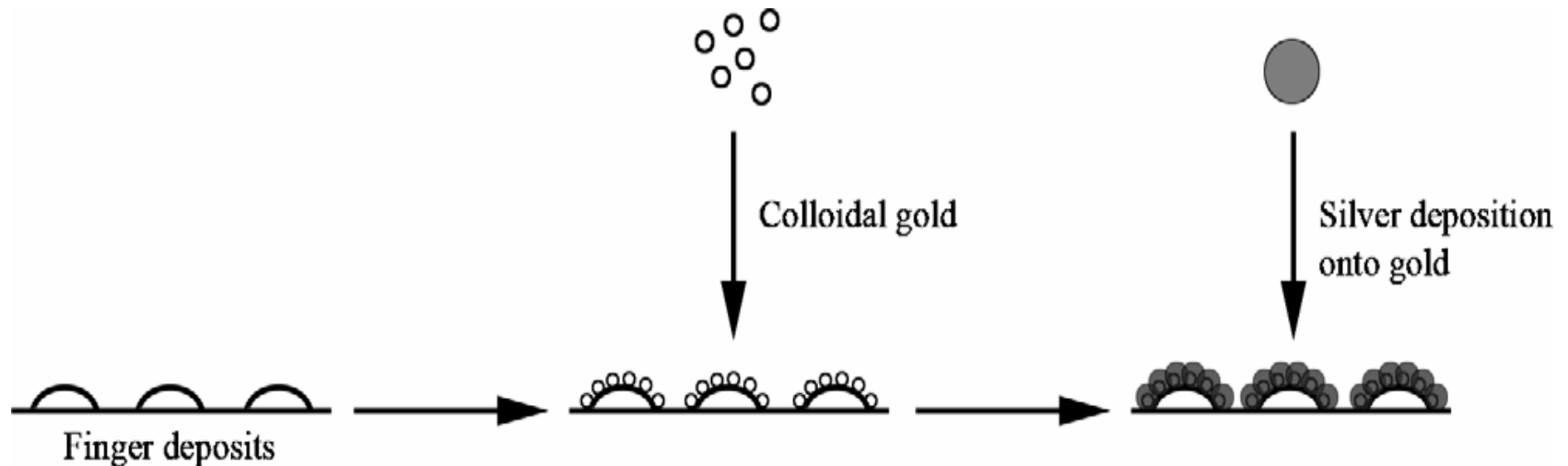
Fingerprint detection

- **Magnetic fingerprinting powder**
- **Superglue method**
- **Fuming with iodine**
- **Ninhydrin**
- **Nanoparticles**



Multi-metal deposition technique

1989 : Multi-metal deposition method (MMD), as a useful mean to detect latent fingerprints on porous and non-porous items, was first proposed by Saunders



Drawback of MMD

- **Bothersome processes to prepare precursors (AuNPs)**
- **High cost preparation**
- **Some harmful solvents involved**

**Single metal nanoparticles
deposition method (SND)**

Objective

Glucose stabilized AuNPs were synthesized and utilized as working solution to detect latent fingerprints.

- **Preparation and detection of AuNPs**
 - **UV–vis spectrophotometer**
 - **Transmission microscopy (TEM)**
 - **SEM and EDAX**
- **Detection of latent fingerprints**
 - **Single metal nanoparticles deposition method (SND)**
 - **Multi-metal deposition (MMD) technique**

Experimental

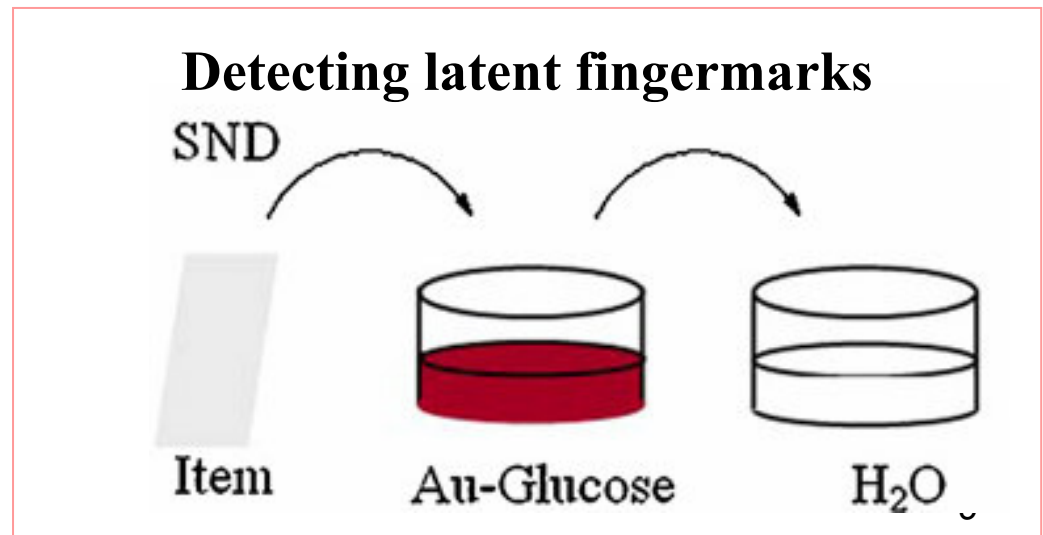
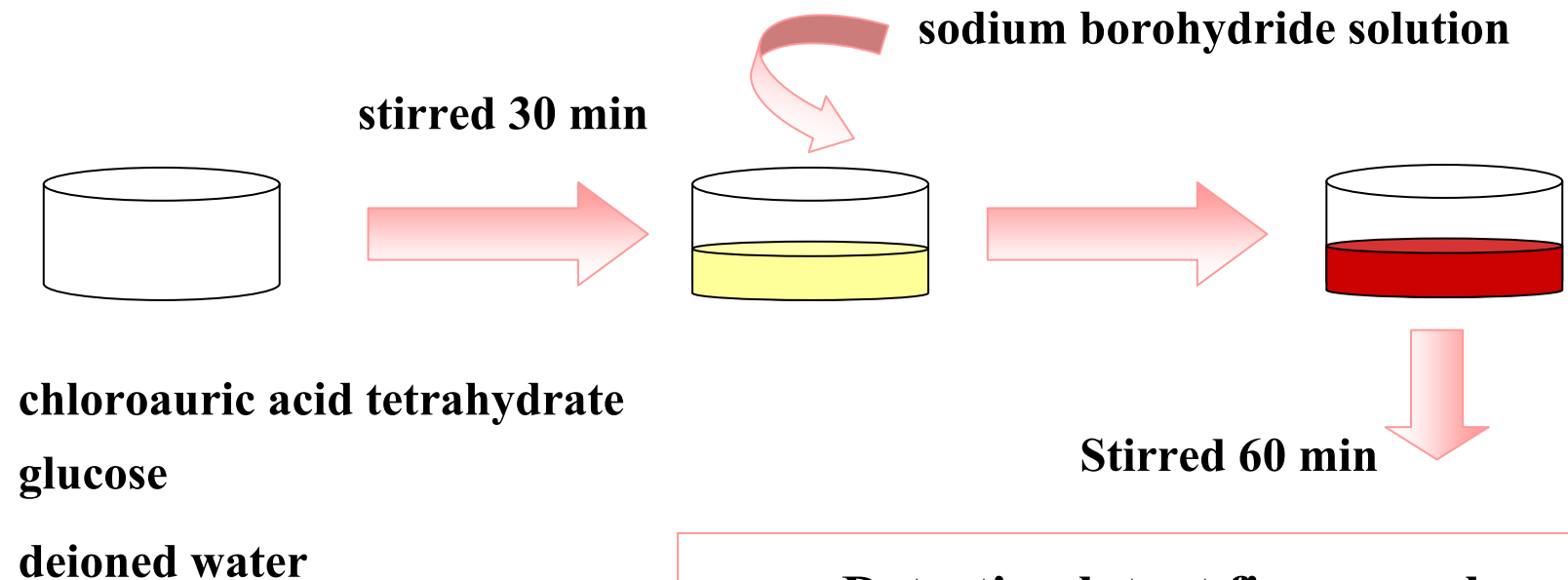
Detection of latent fingerprints

Latent fingerprints were obtained all from one volunteer by rubbing fingers against the forehead and stamping them onto

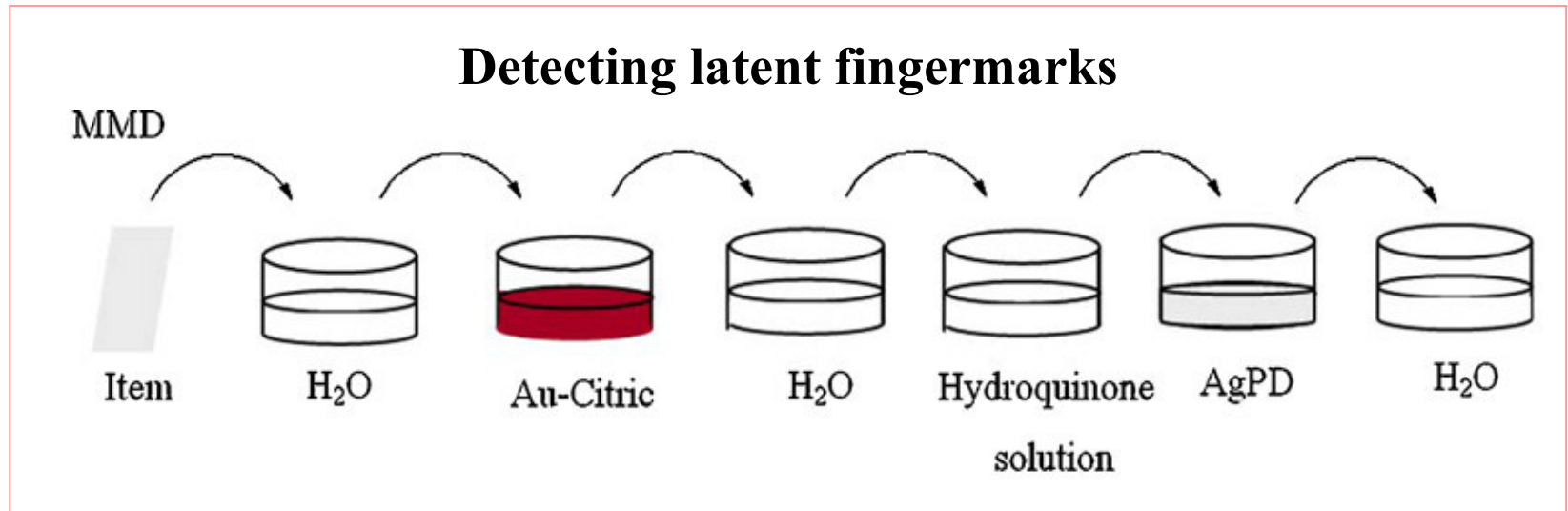
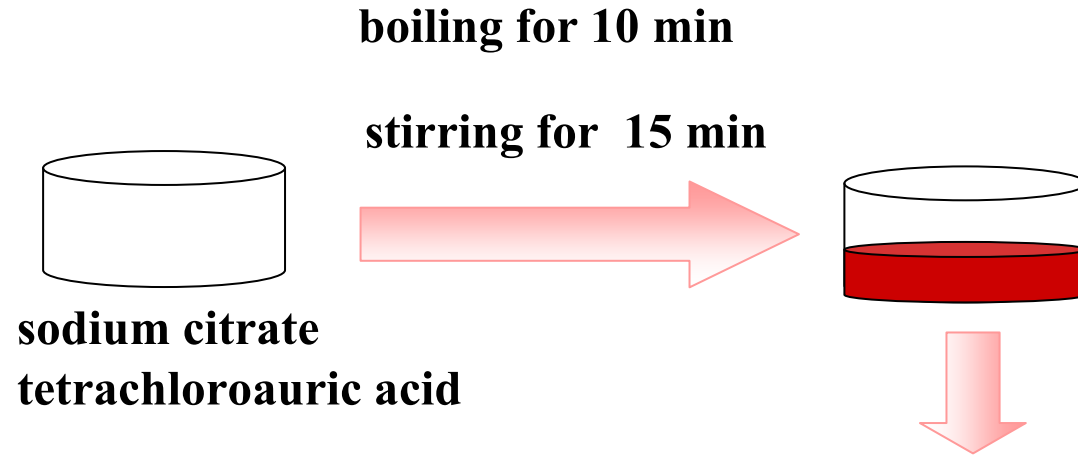
- glass slides
- plastic
- tin foil



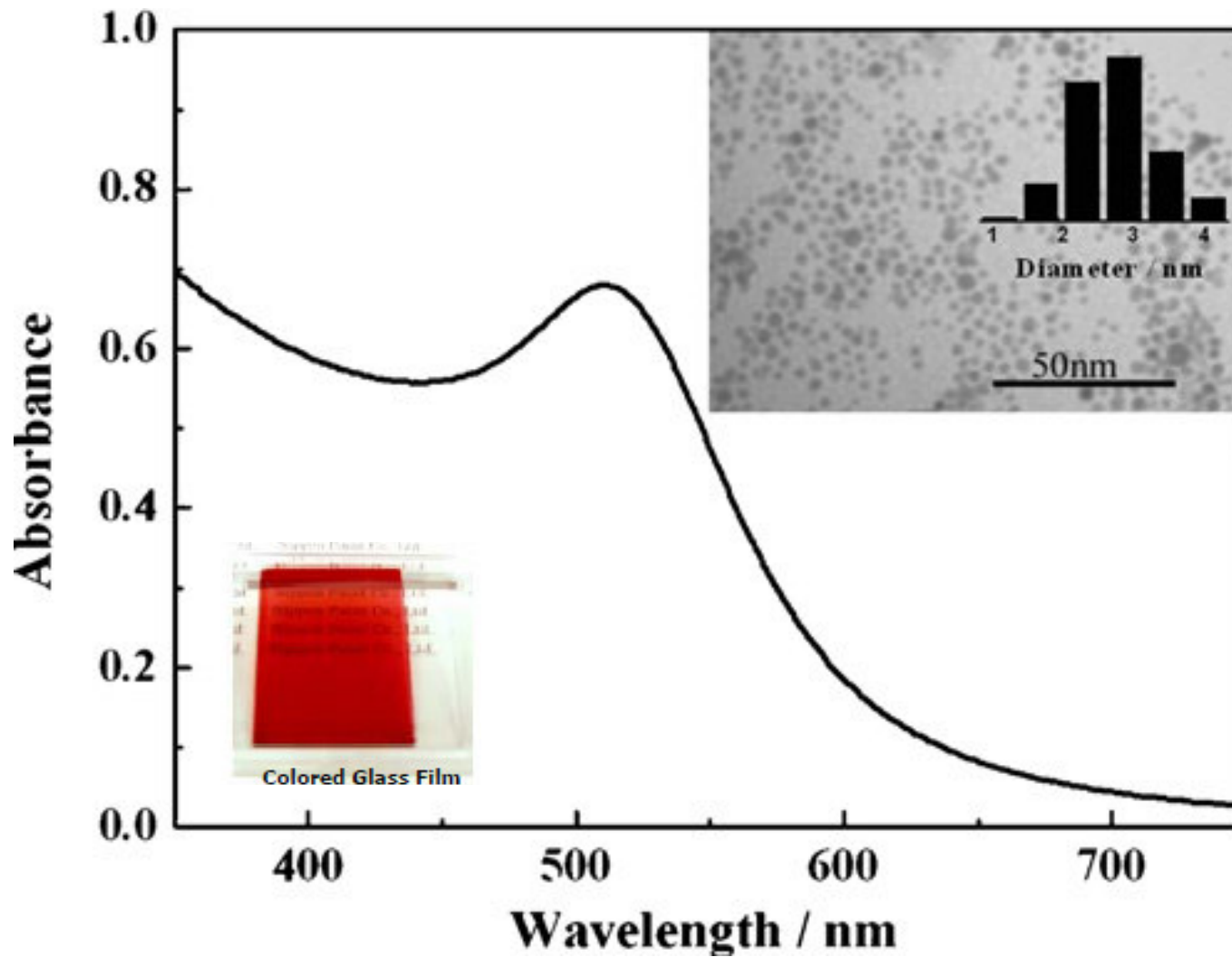
SND technique



MMD technique



UV-vis and TEM measurement



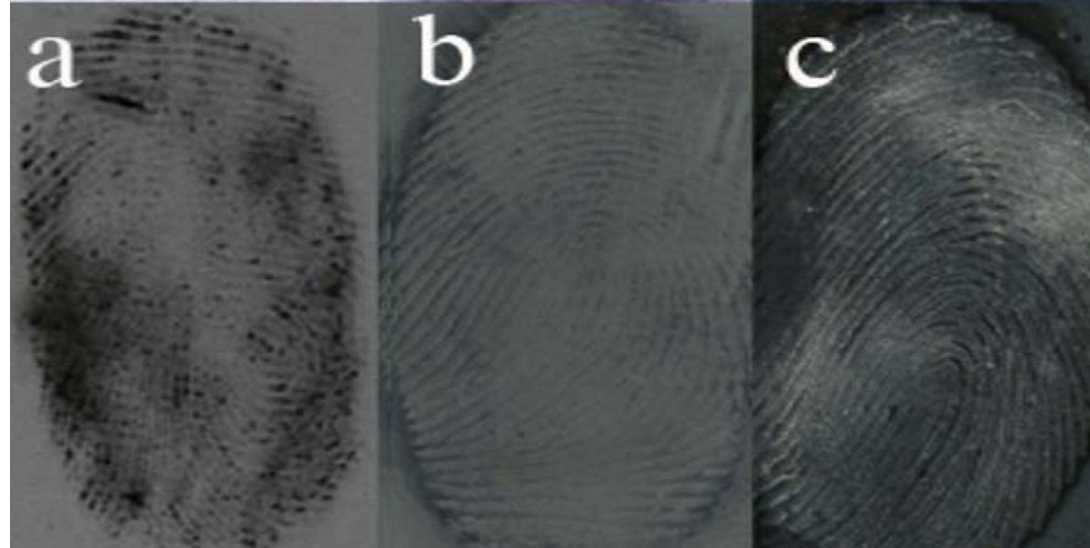
**Latent fingerprints were developed with the SND technique
and with the MMD technique**

**SND
technique**

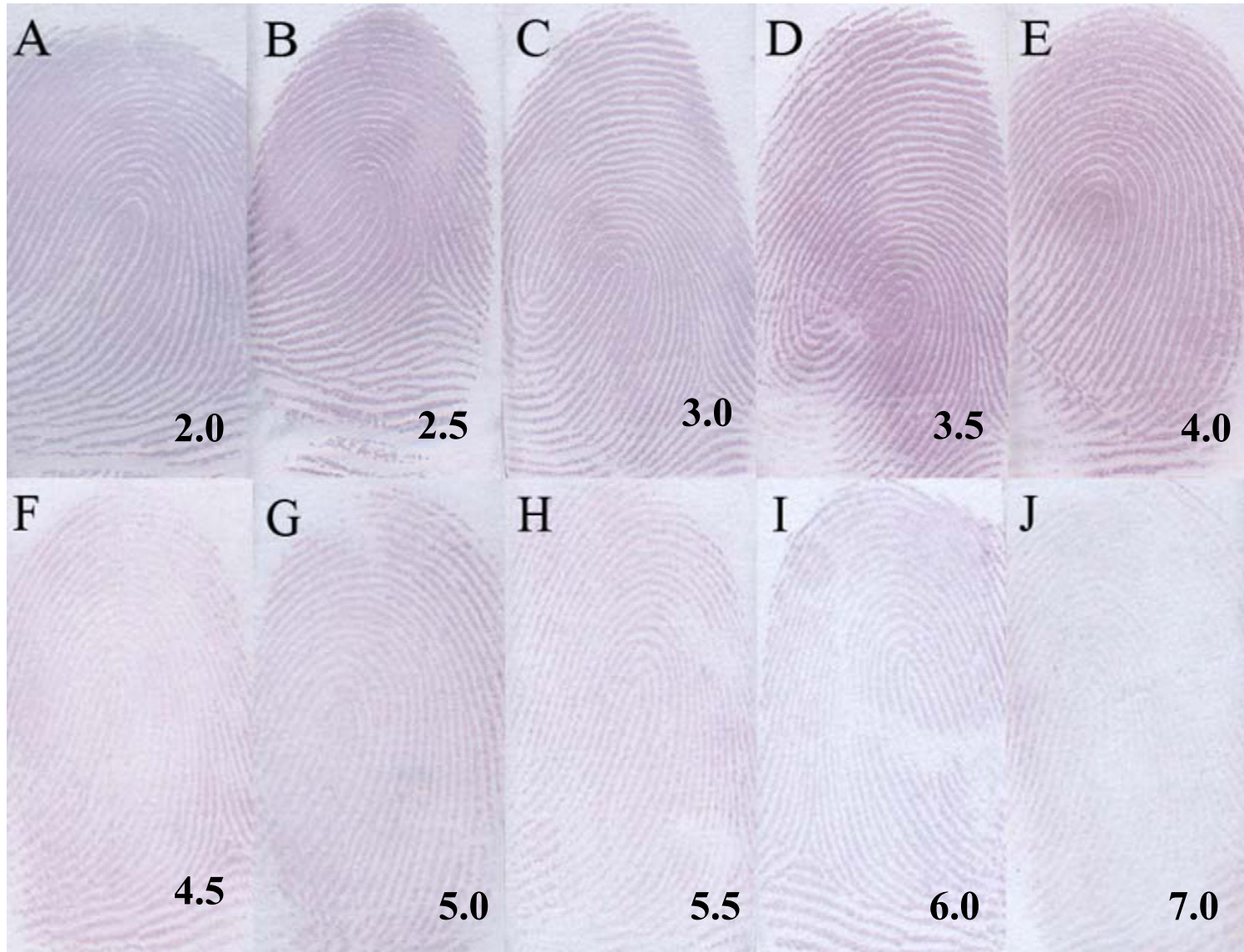


- (A) glass slide**
- (B) plastic**
- (C) tin foil**

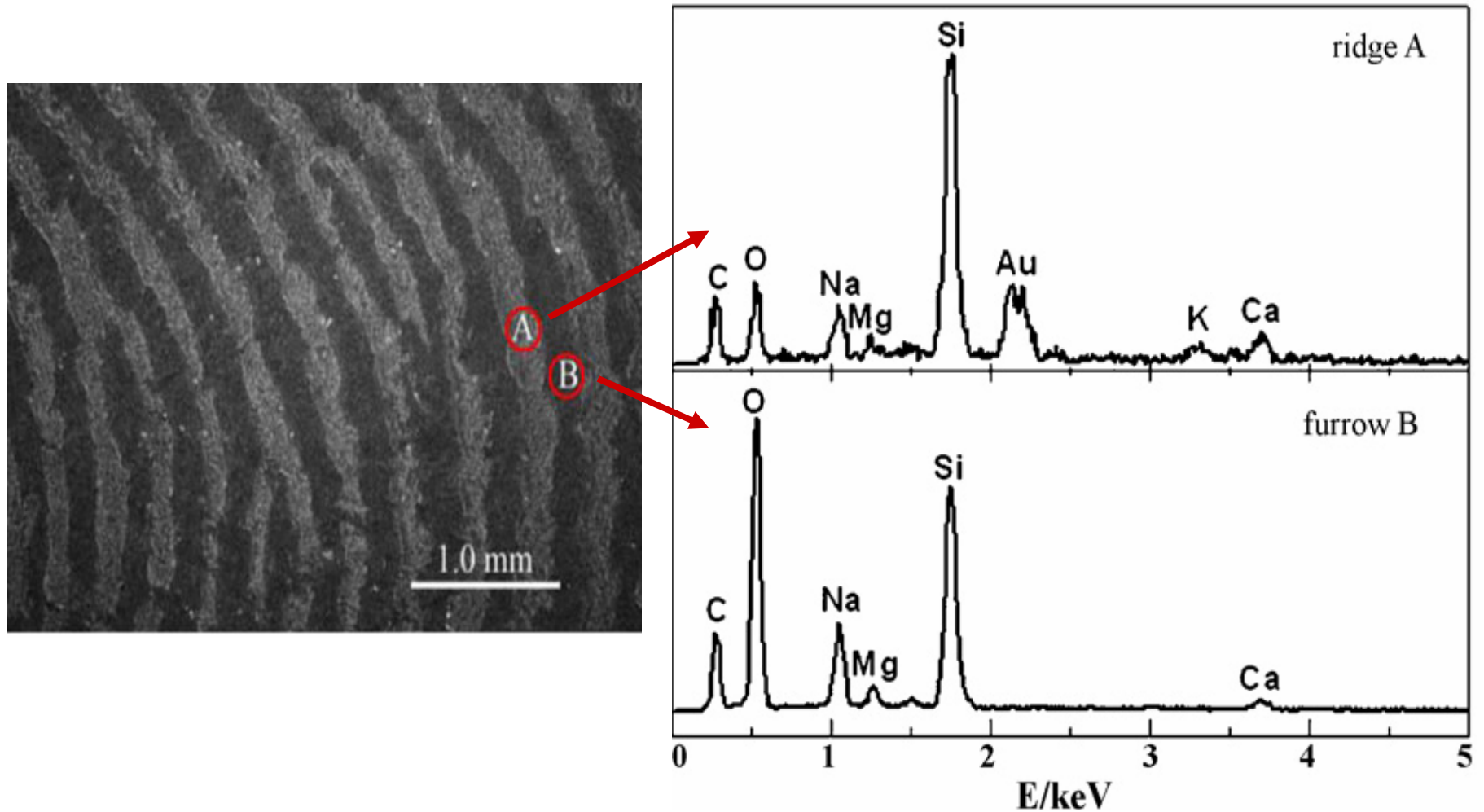
**MMD
technique**



The influence of the pH on detecting latent fingerprints



SEM and EDAX analysis



fingermarks with glucose stabilized AuNPs on silicon wafer¹⁴

Conclusion

- **Simple for detecting latent fingerprints**
- **clear ridge details in a wide pH range (2.5–5.0)**
- **Environment friendly**
- **Sharp and clear development of latent fingerprints**
- **Without background staining**



Thank You