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## Identification of Au atoms on Pt(110) using STM via Image States

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Scanning Tunneling Microscope is now accepted as one of the most powerful surface science tools to image surface structures. But since valence band structure of many elements are very similar, it is difficult to identify chemical elements.

It is even more difficult to obtain an elemental contrast between different metals. By means of STM, image contrasts between different metals may be obtained if the local electron density of states of those two are different near their Fermi levels.

There are so many similar properties between Pt and Au. Both (110) surface structures reveal missing row  $1 \times 2$  reconstructions, and the lattice mismatch is  $\sim 4\%$ . We have used the image state of Au in order to identify Au atoms against Pt(110).

After *in situ* deposition of Au on Pt(110) and annealing at about  $550^\circ\text{C}$ , the surface was imaged in dual scan mode by alternating tip bias voltage from one to another at every image pixel. Au islands appeared bright with the tip voltage of  $\sim -5\text{V}$  which corresponds to a Au surface state. Au atoms on Pt(110) aggregated together in the form of islands and stuck to the step edges of Pt(110). The results can be explained by difference of surface energies at various sites.