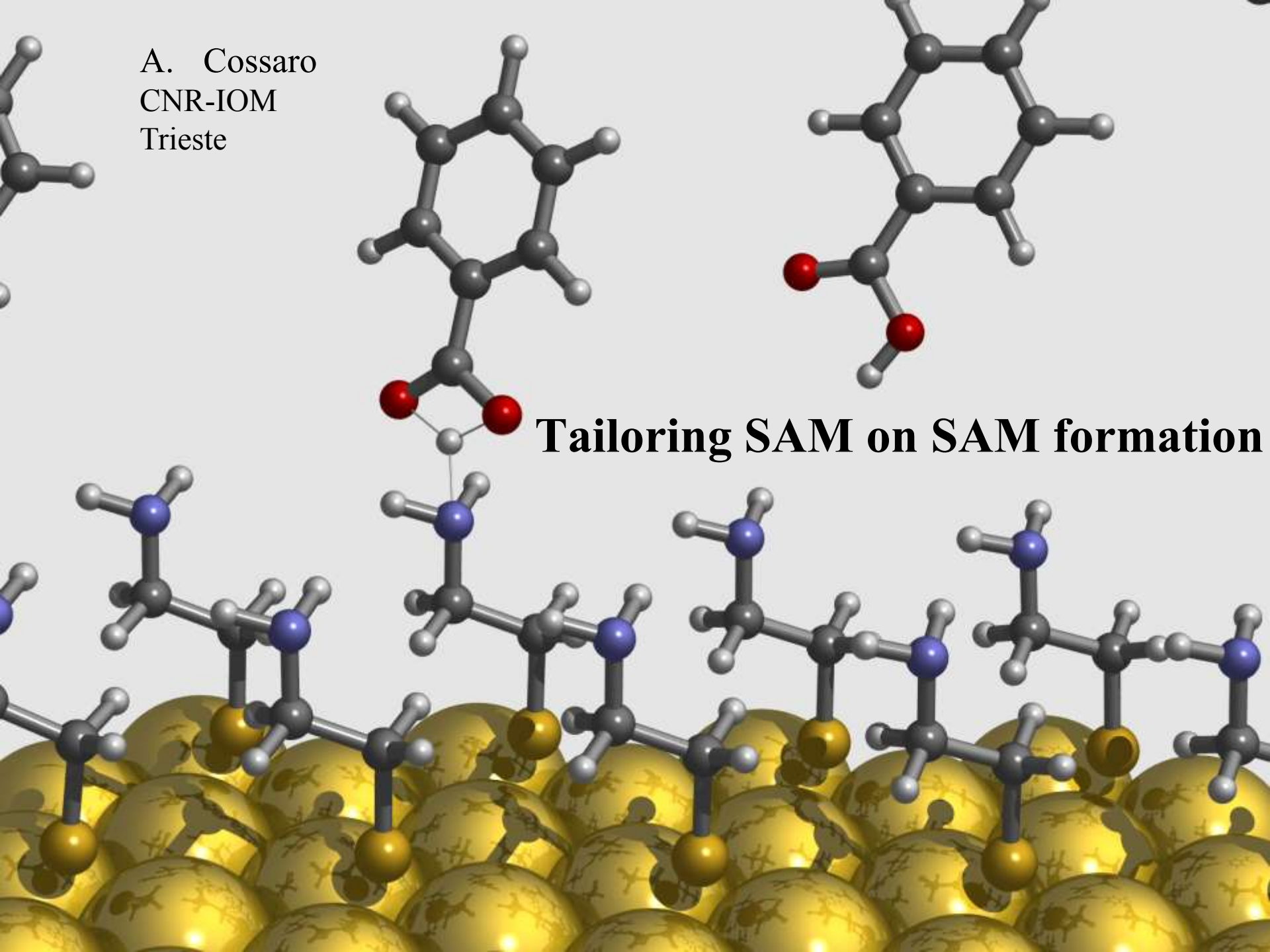


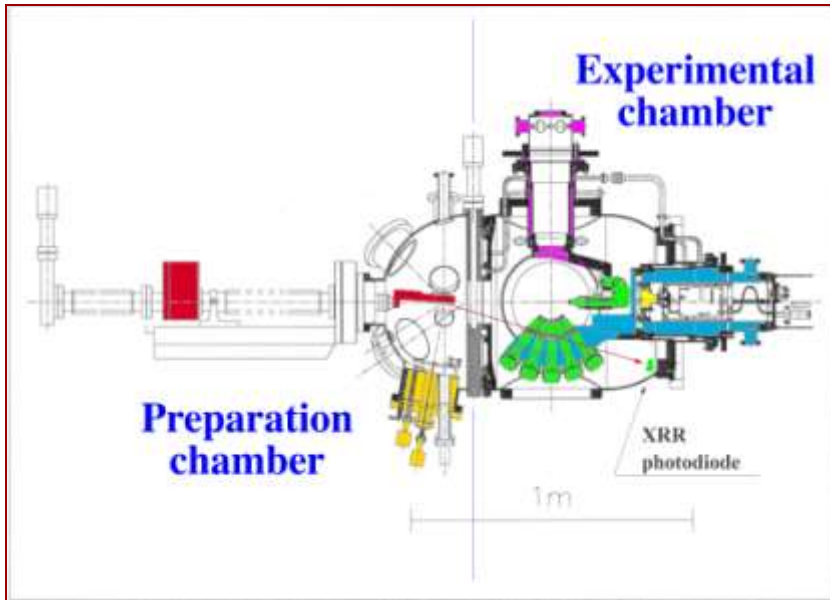
A. Cossaro
CNR-IOM
Trieste



ALOISA beamline



Elettra, Trieste



Hv energy range: 120-8000 eV

High Resolution Photoemission Spectroscopy

X-Ray Photoelectron Diffraction

Grazing Incidence X-Ray Diffraction

X-Ray Reflectivity

Absorption Spectroscopy

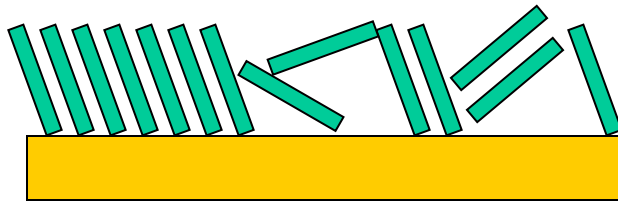
Photoemission Coincidence Spectroscopy

Luca Floreano
Albano Cossaro
Alberto Verdini
CNR-IOM

Alberto Morgante
CNR-IOM
Università di Trieste

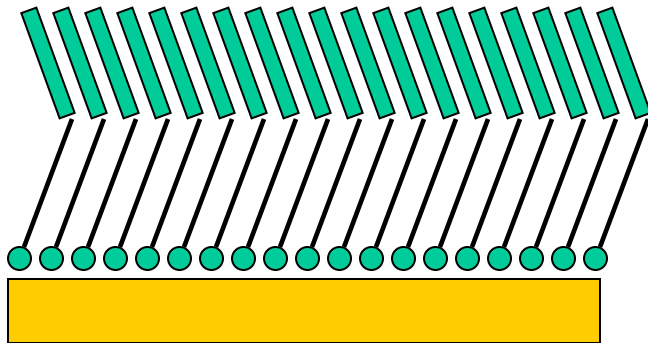
Dean Cvetko
Gregor Bavdek
Gregor Kladnik
Ljubljana University

Metal-organic interfaces



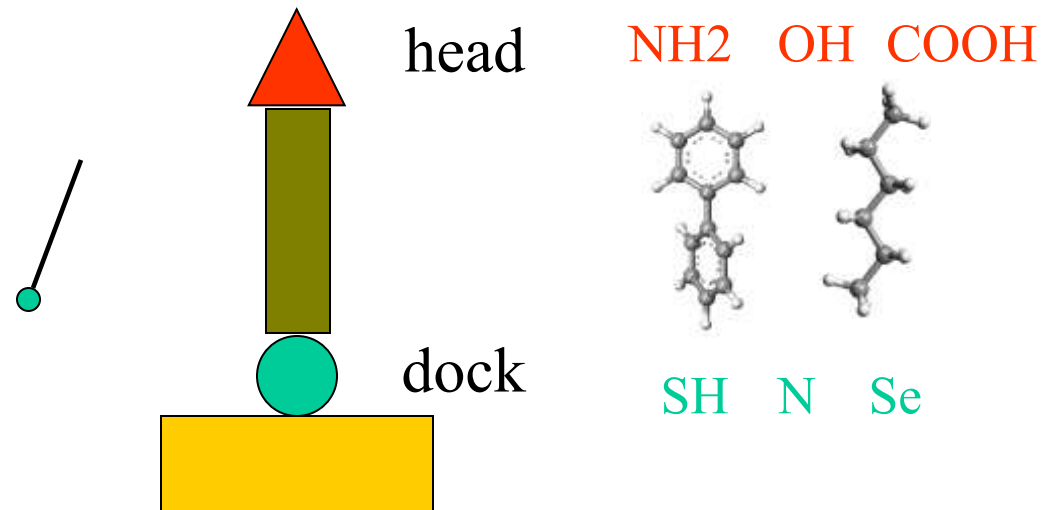
Electronic transport efficiency
System reliability

SAM interposition



Homogeneous interface morphology
Improved electronic transport

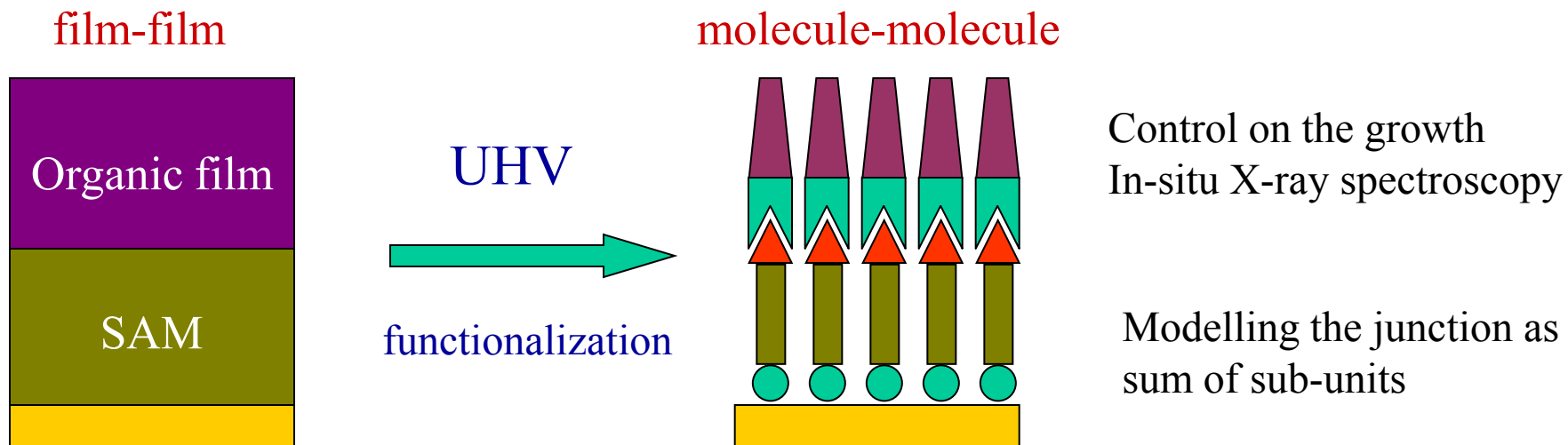
I. Kymissis et al. IEEE 2001



Tailoring of the Work Function
Electronic levels alignment

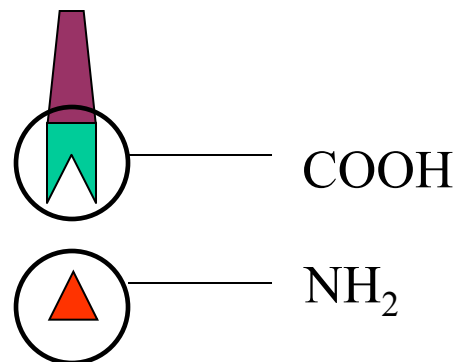
Heimel et al. NanoLetters 2007

Our approach



ω -alkanethiols on Au(111)

Dense packing
Thermal stability
Homogeneity

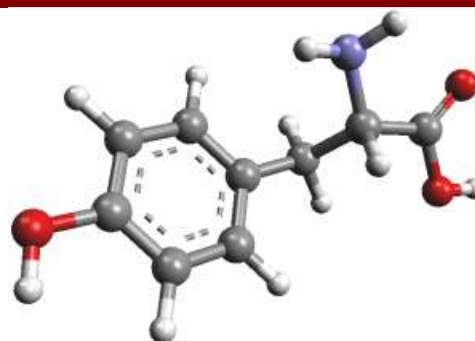


aminoacids self-assembly

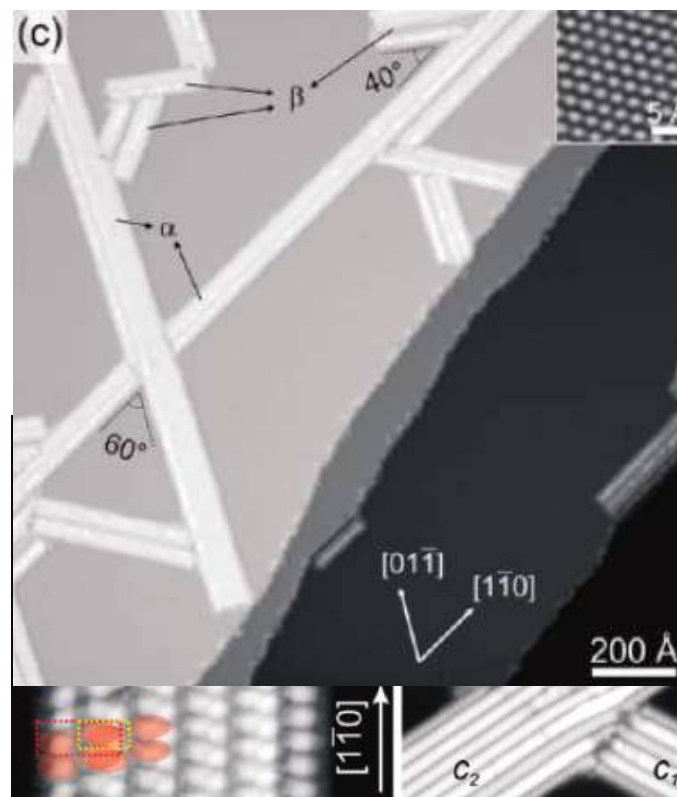
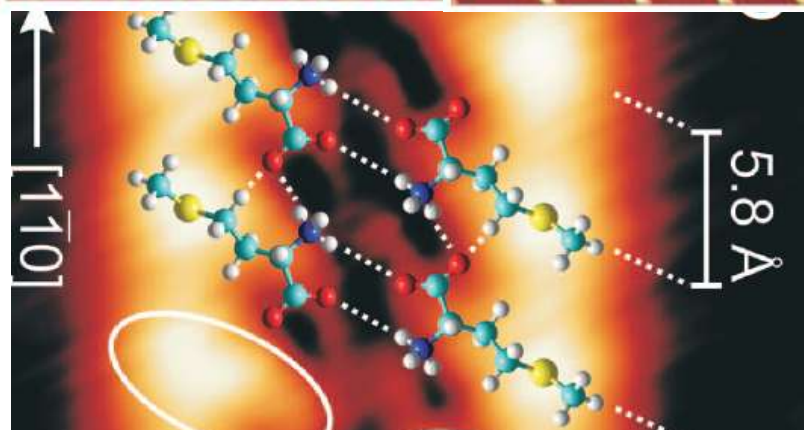
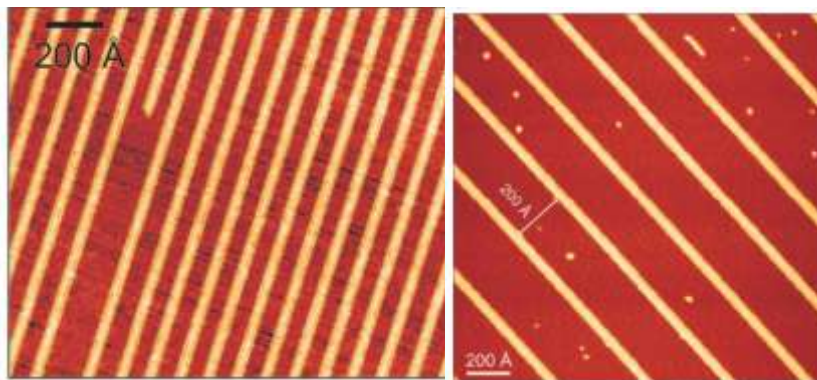
The NH₂-COOH chemical affinity



L-methionine
on Ag(111)



L-tyrosine
on Ag(111)



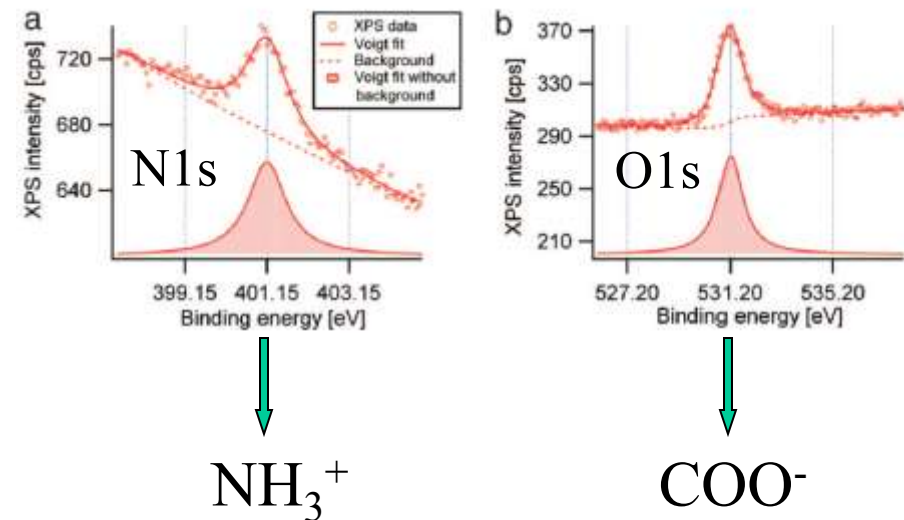
in coll. with J. Barth

PNAS 2007

ACS Nano 2010

The NH₂-COOH chemical affinity

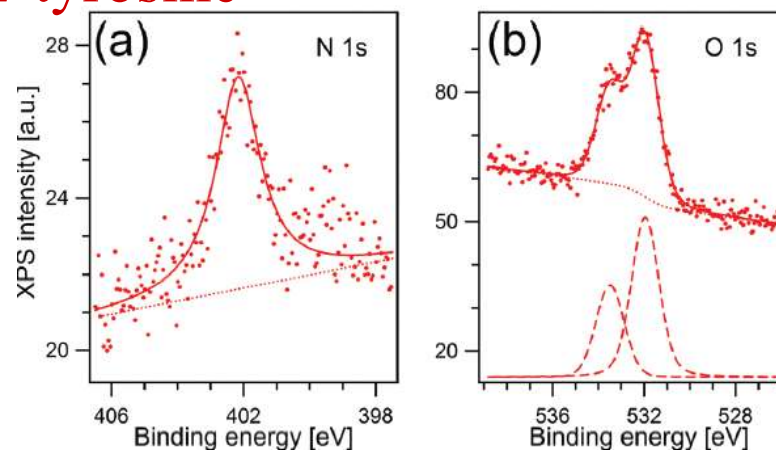
L-methionine



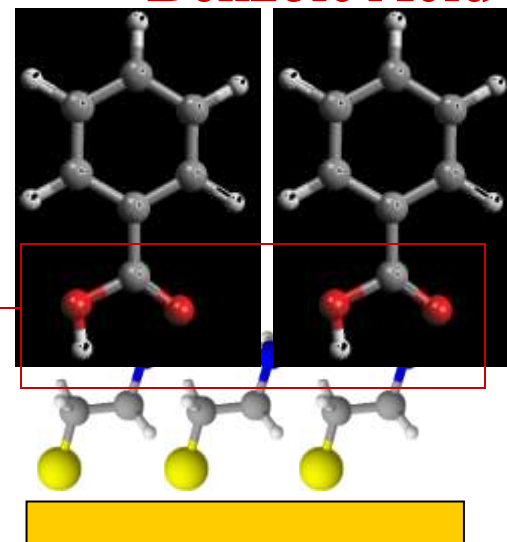
molecules in their zwitterionic form

COO⁻-NH₃⁺ interaction drives the formation of templates of biomolecules

L-tyrosine



Benzoic Acid



Cysteamine / Au(111)

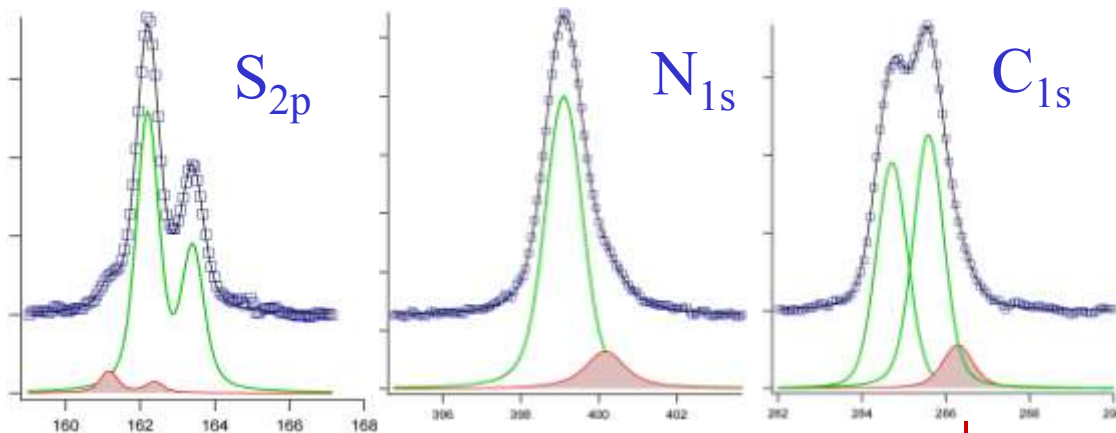
1. Functionalization : in-situ CA monolayer formation

XPS

S_{2p}

N_{1s}

C_{1s}



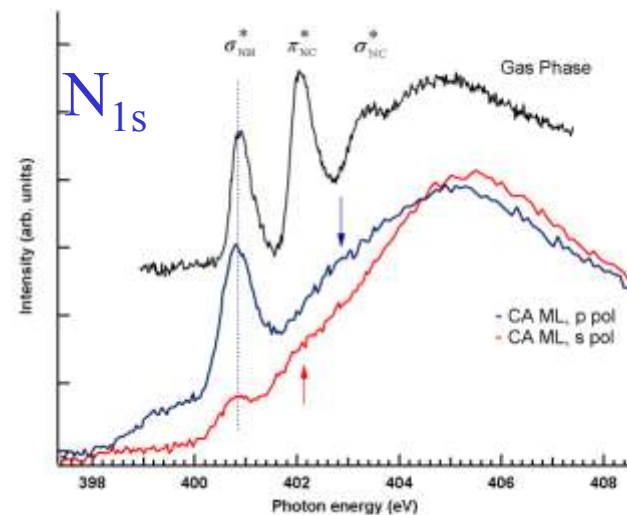
Thiolate bond

NH₂

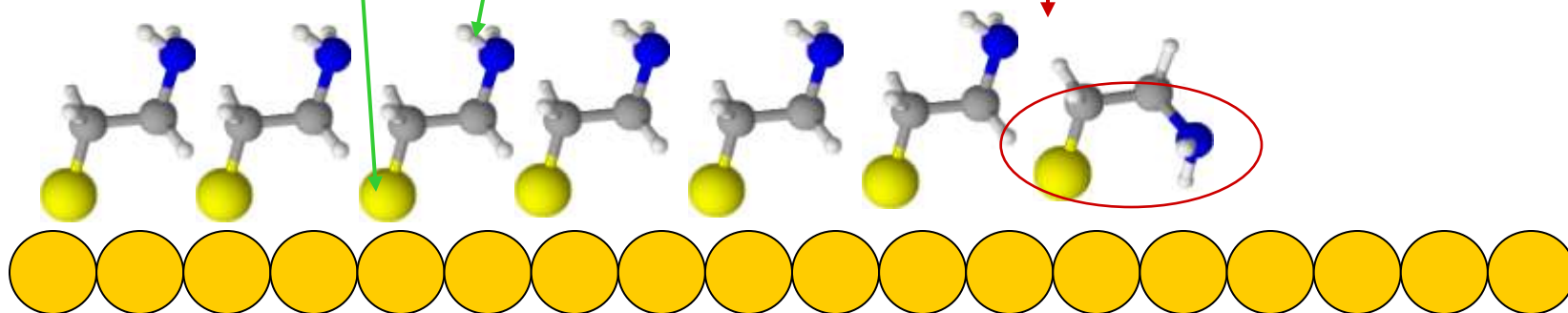
gauche defects or
lying down CA

NEXAFS

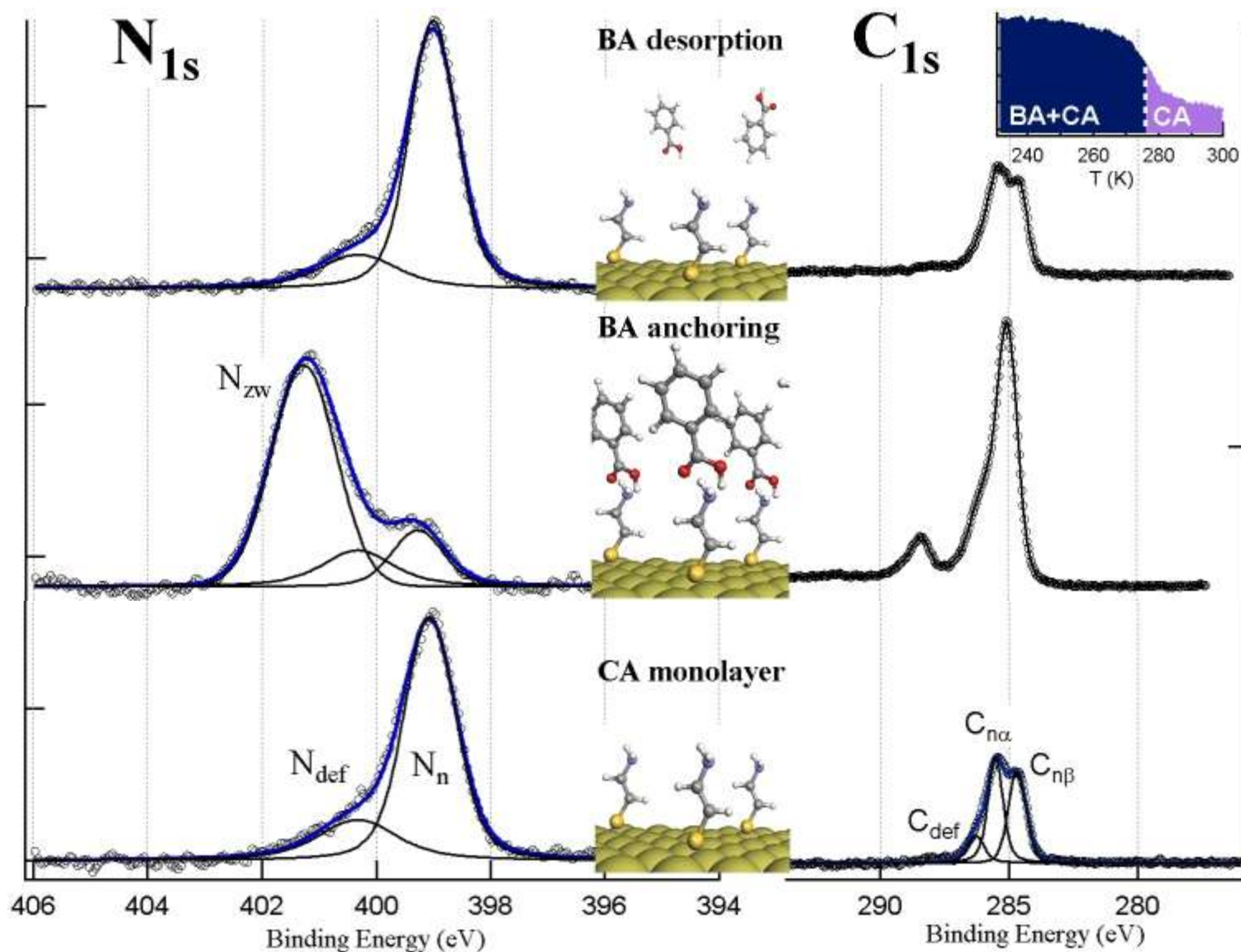
N_{1s}



Standing-up



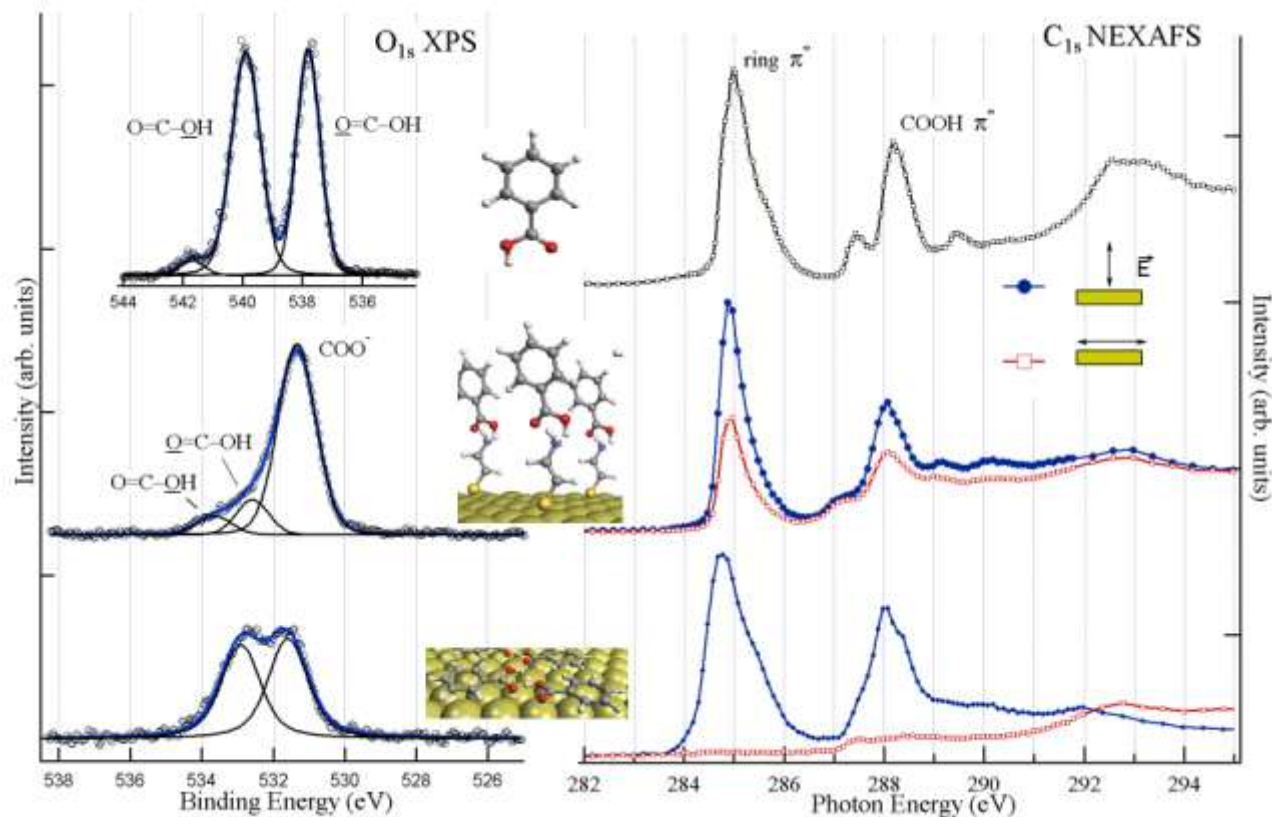
2. Anchoring: Benzoic Acid Deposition on CA



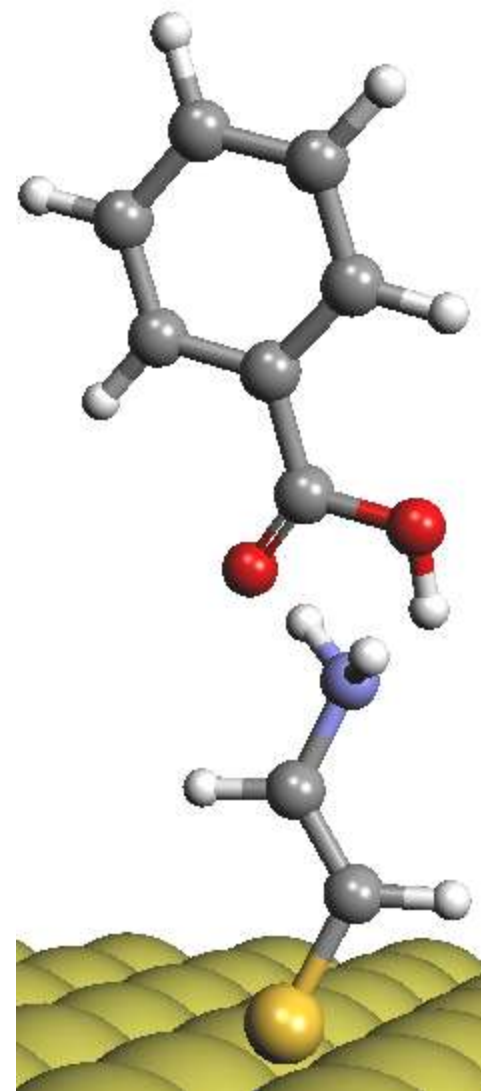
$NH_3^+-COO^-$ bond formation
High anchoring efficiency

J. Phys. Chem. Lett. 2011

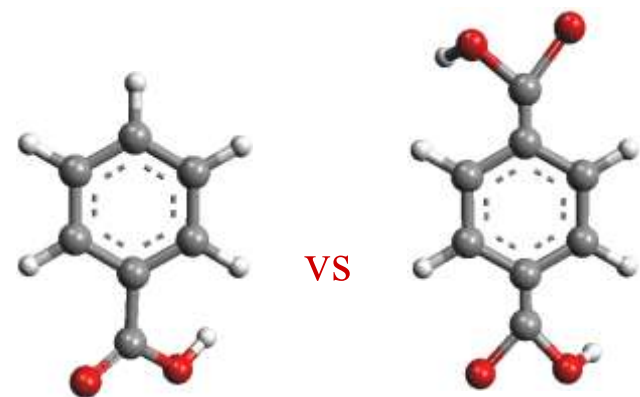
2. Anchoring: Benzoic Acid Deposition on CA



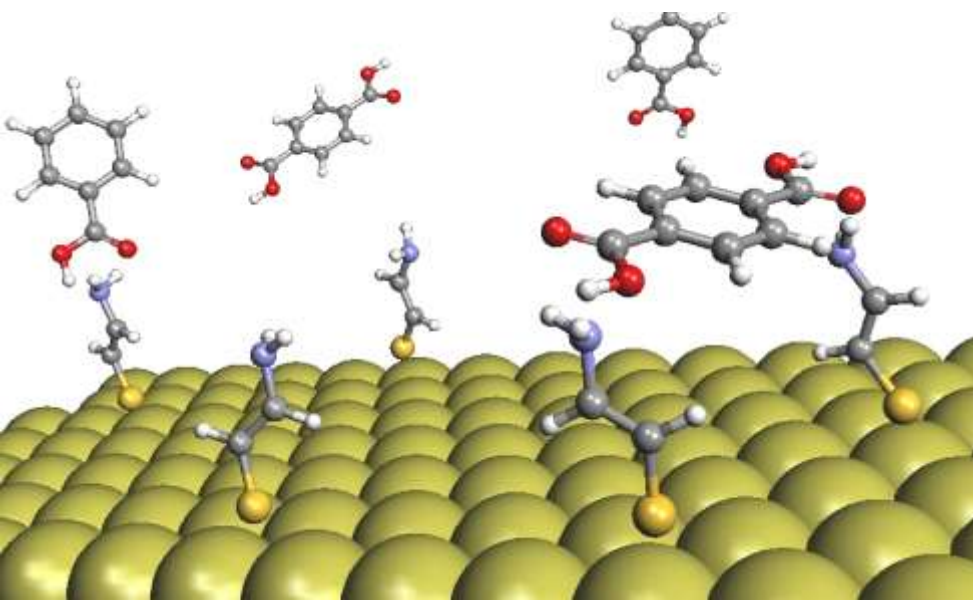
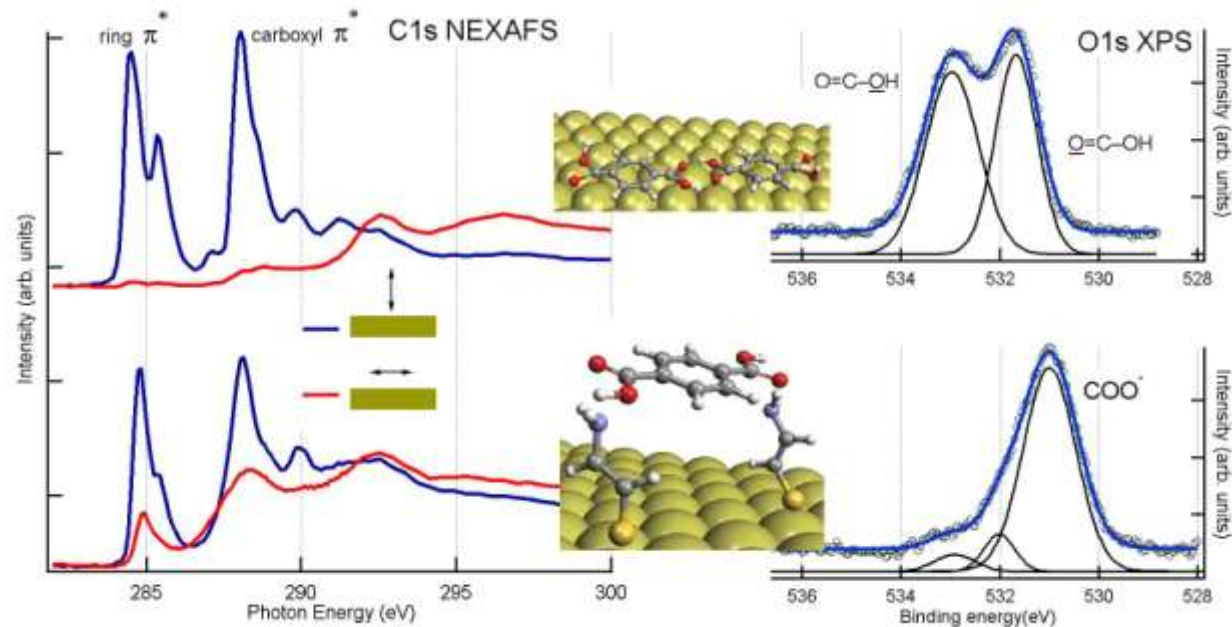
most of BA are anchored
anchoring changes the adsorption geometry



Bi-dentate anchoring: TPA vs BA



TPA: lying down adsorption
bi-dentate anchoring



Morphology changes by selecting
the number of anchoring groups

Spectroscopy

Resonant Photoemission

DFT

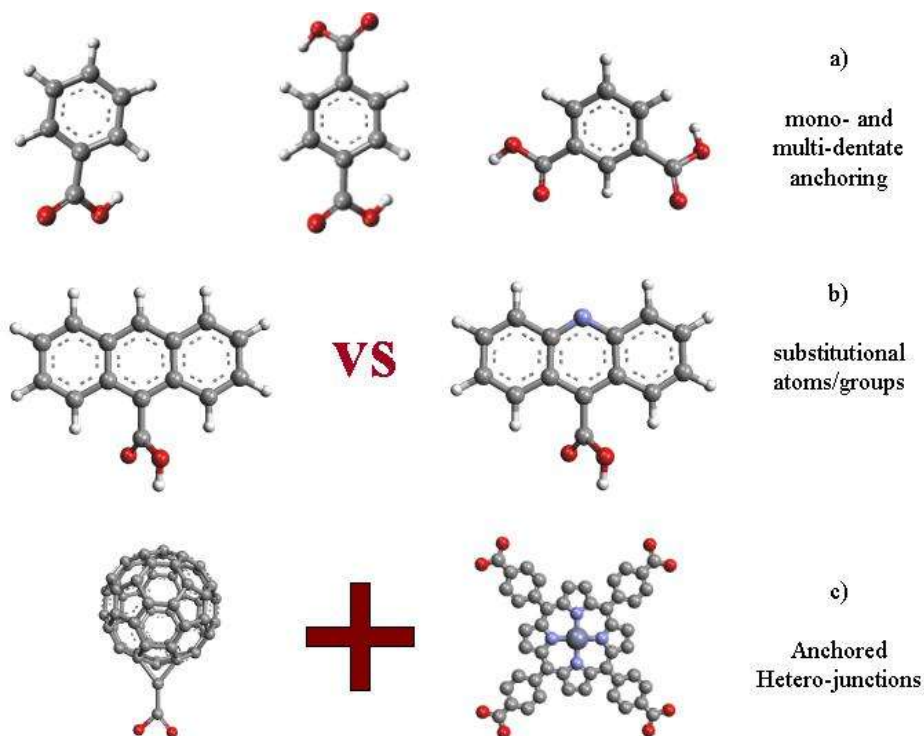
Amino-carboxylic bond

STM

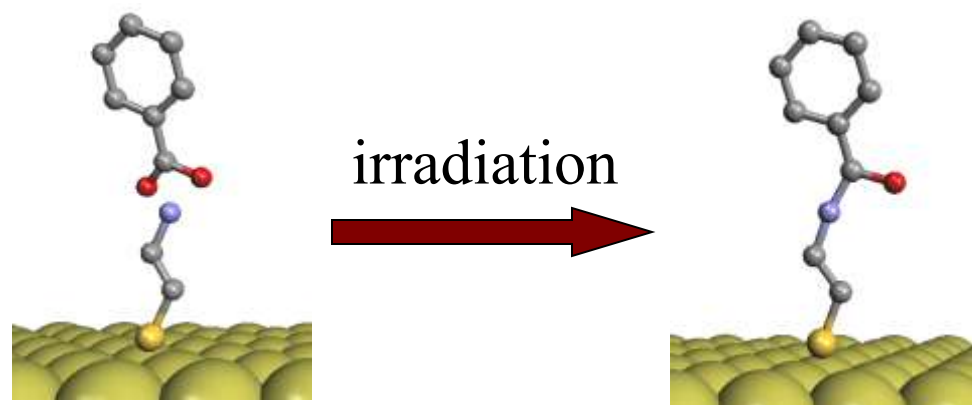
Imaging

STS - conductance

Carlo Dri, Università di Trieste

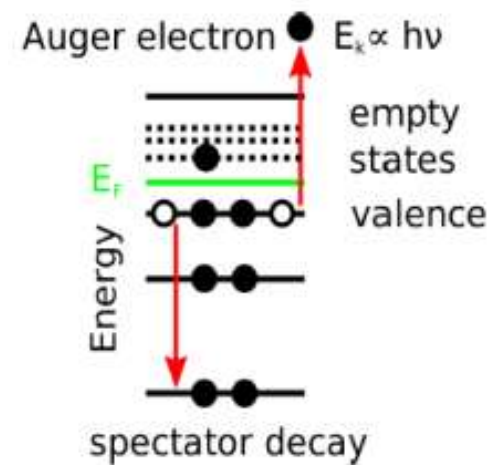
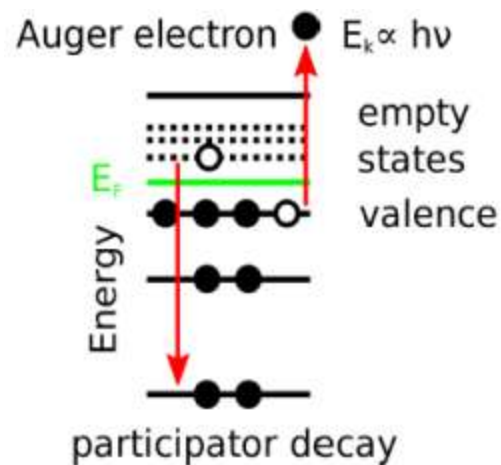
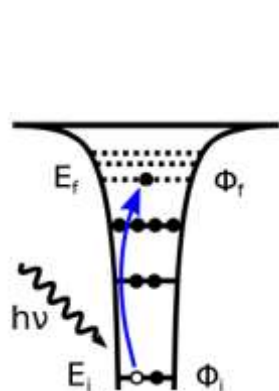


Covalent bond formation



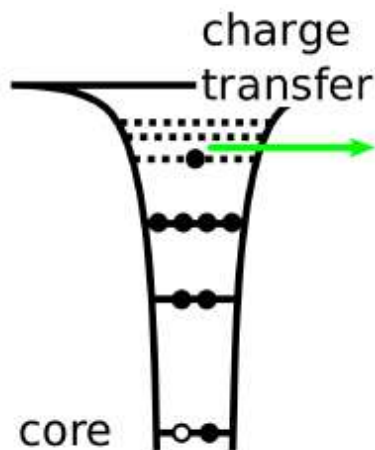
New approach for device design

Resonant X-Ray Photoemission



1. Resonant excitation

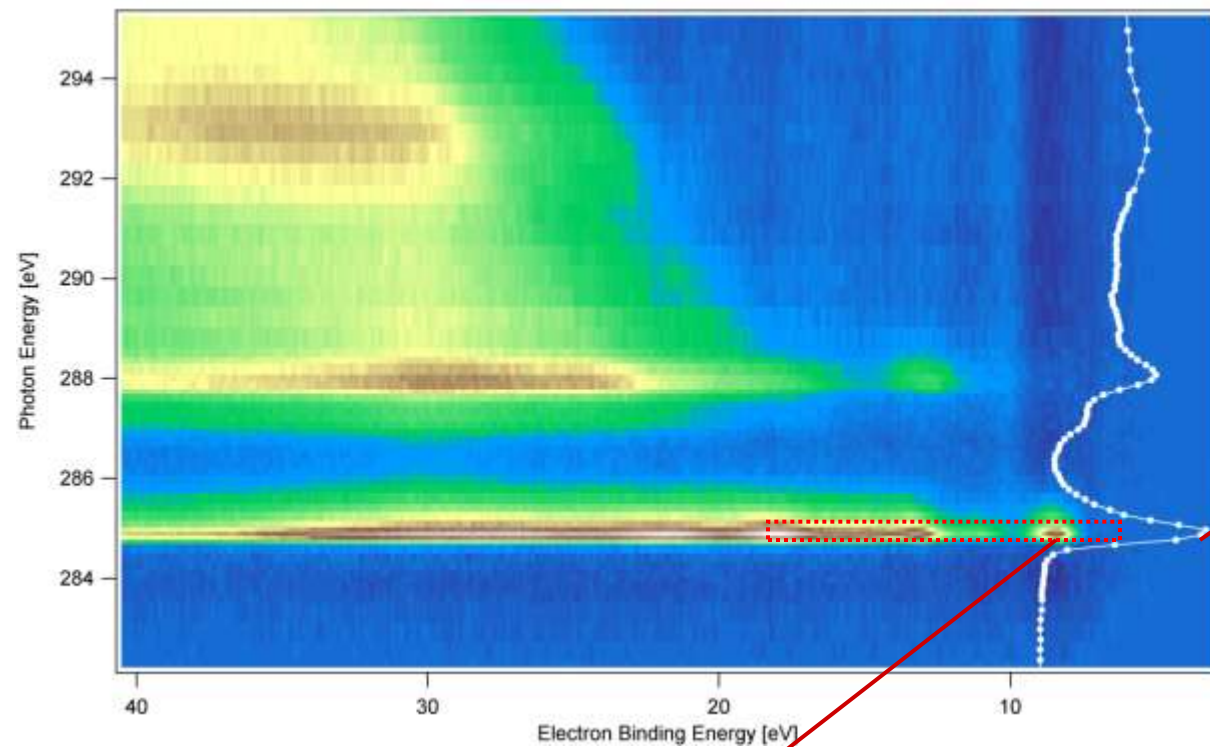
2. non radiative decay channels



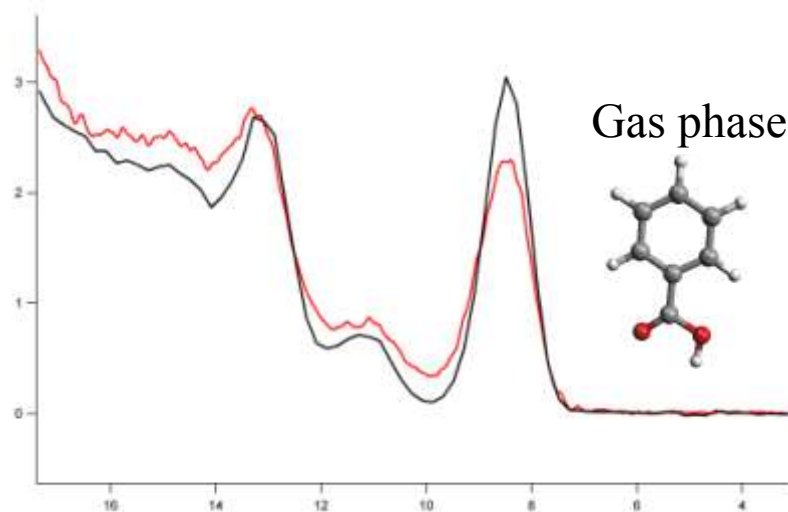
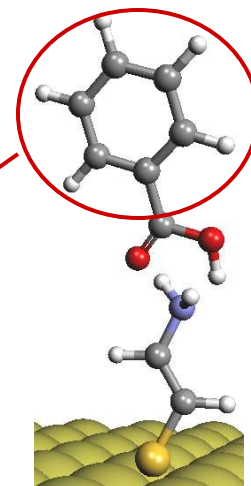
Normal Auger Decay

Quenching of the resonance
in the Valence Band

Resonant Photoemission: first results



C1s edge



Gas phase

Quenching of the resonance
due to the anchoring process

Evidence of BA/Au electronic transport
mediated by CA

ALOISA

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Prot. RBFR10FQBL

