3. Principles to Plasma Surface Activation Treatment 3.4 Plasma surface activation process (1/3)

Plasma surface activation and binding energy by XPS



Basic physics [edt]

Because the energy of an X-ray with particular wavelength is known (for Al K_o X-rays, $E_{photon} = 1486.7 \text{ eV}$), and because the emitted electrons' kinetic energies are measured, the electron binding energy of each of the emitted electrons can be determined by using the photoelectric effect equation,

$E_{\text{binding}} = E_{\text{photon}} - (E_{\text{kinetic}} + \phi).$

where E_{binding} is the binding energy (BE) of the electron measured relative to the chemical potential, E_{photon} is the energy of the X-ray photons being used, E_{kinetic} is the kinetic energy of the electron as measured by the instrument and ϕ is a work function-like term for the specific surface of the material, which in real measurements includes a small correction by the instrument's work function because of the contact potential. This equation is essentially a conservation of energy equation. The work function-like term ϕ can be thought of as an adjustable instrumental correction factor that accounts for the few eV of kinetic energy given up by the photoelectron as it gets emitted from the bulk and absorbed by the detector. It is a constant that rarely needs to be adjusted in practice.

Work function	tion 20, at h		- segarge	
Artes Tub	Read Coll	Versitiatary	Tools v	
From Wispedia, the tree encyclopedia				

In unit-store physics, the work function (ponetrines spell workfunction) in the minimum transforgeries work (i.e., energy) needed to remove air wechnin form a mole to a point in the vacuum interediately conside the solid surface. Here "intredictely" means that the final electron position is for here the solidox on the above soles, but shill be close to the solid to be influenced by antiant electric fields in the soles. The work function is not a characteristic of a bulk material. But shill be close to the solid to be there and (operating long start loop and constraints) in it a characteristic of a bulk material. But shill be close to the solid to be the retained (operating on crystal loop and constraints).



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3. Principles to Plasma Surface Activation Treatment 3.4 Plasma surface activation process (2/3)

Polar Bond from plasma surface activation (hydrophilicity)



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R Cost Incastor	Ligand-free rutile and anatase TiO ₂ nanocrystals as		
On the ISC An. (817 7 2016)	electron extraction layers for high performance inverted polymer solar cells†		
	Lije Zhu, Gipeng Lu, Longfong Lx, Yue Wang, Yufeng Hu 🔍 * Zhenbo Dang.* Zhidone Lou, Yarking Hou 🖗 and Tene Teng		

Plasma Surface Modification of 3Y-TZP at Low and Atmospheric Pressures with Different Treatment Times

Sung Un Kang ^{1,1}, Chul-Ho Kim ^{1,1,1}, Sanghyun You ¹, Da-Young Lee ¹, Ya-Kwan Kim ⁴⁽⁶⁾, Seung-Joo Kim ⁴⁽⁶⁾, Chang-Koo Kim ^{1,4,0} and Hee-Kyang Kim ^{1,4,0}

3.4 Plasma surface activation process (3/3)

Dangling Bond of surface

In chemistry, a dangling bond is an unsatisfied valence on a fixed atom. Atoms with dangling bonds refer to their structural and chemical similarity to free radicals and are also called immobilized free radicals or immobilized radicals. When we talk about dangling bonds, we generally refer to the above states that contain one electron and thus lead to a neutrally charged atom. There are also dangling bond defects that contain two electrons or no electrons. These are negatively and positively charged respectively. A dangling bond containing two electrons has an energy close to the valence band of the material, and a dangling bond with no electrons has an energy close to the conduction band.





530eV (Lattice Oxide: Left Shift/dangling)