

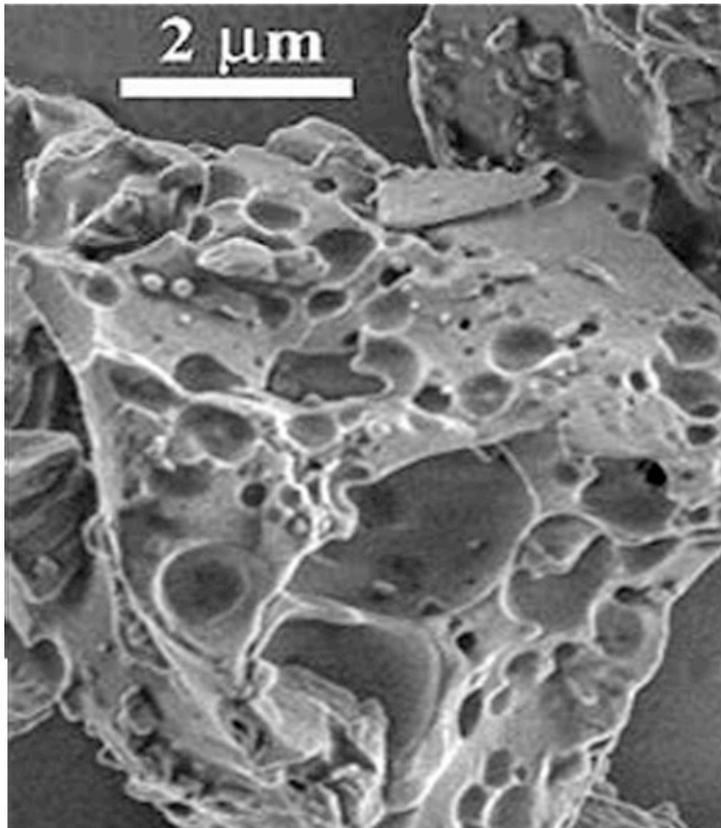
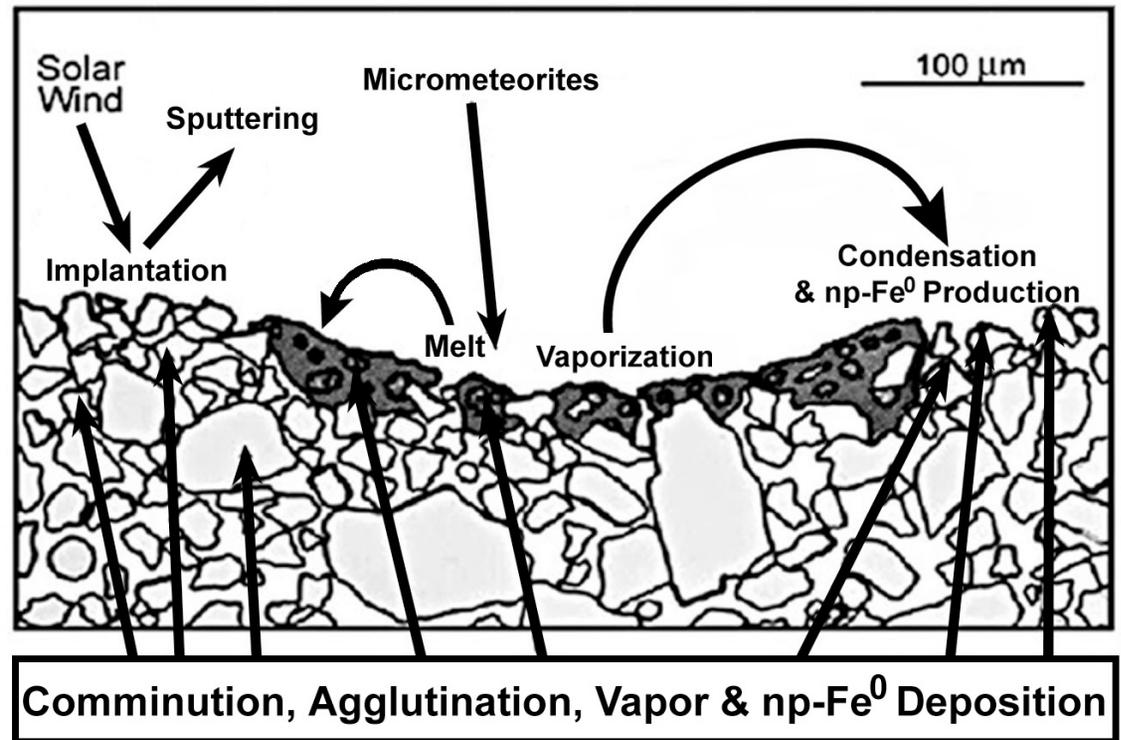


# **Chemical Reactivity of Activated Lunar Regolith Grains**

**Aaron Zent  
NASA Ames Research Center**

**Gene Cernan - Apollo 17  
Very, very dirty**

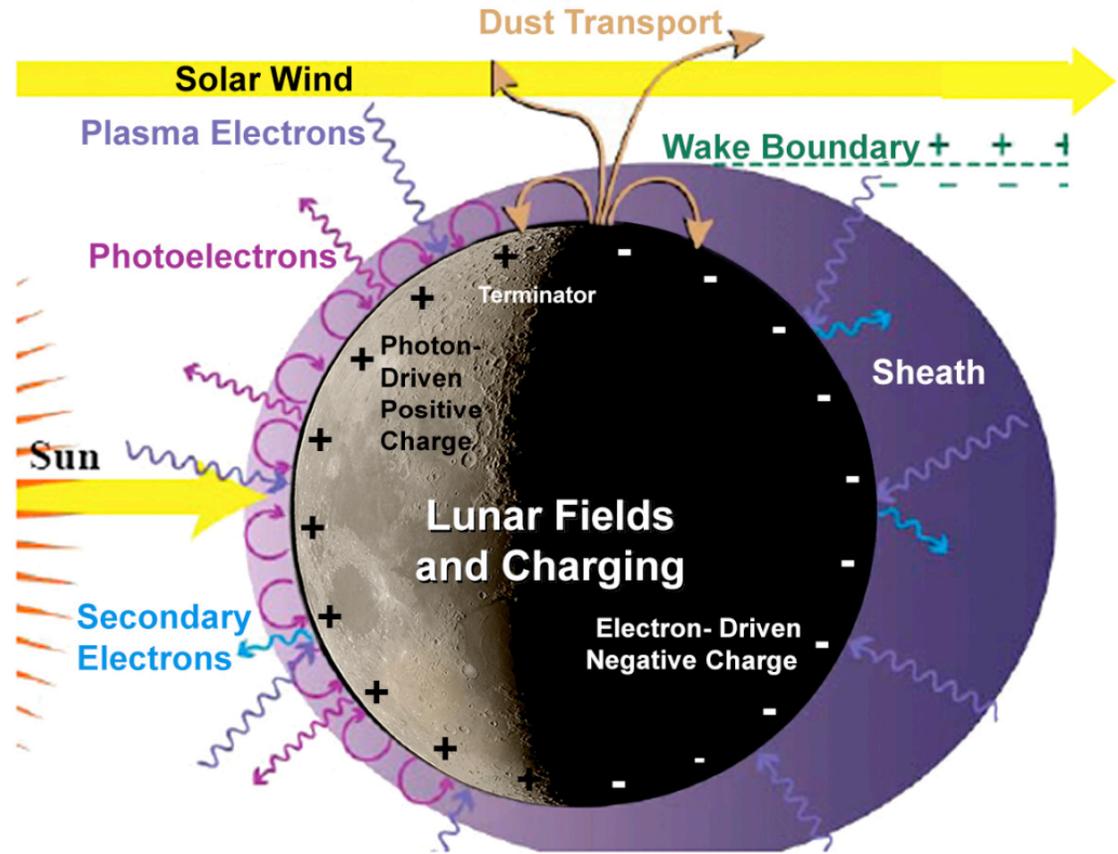
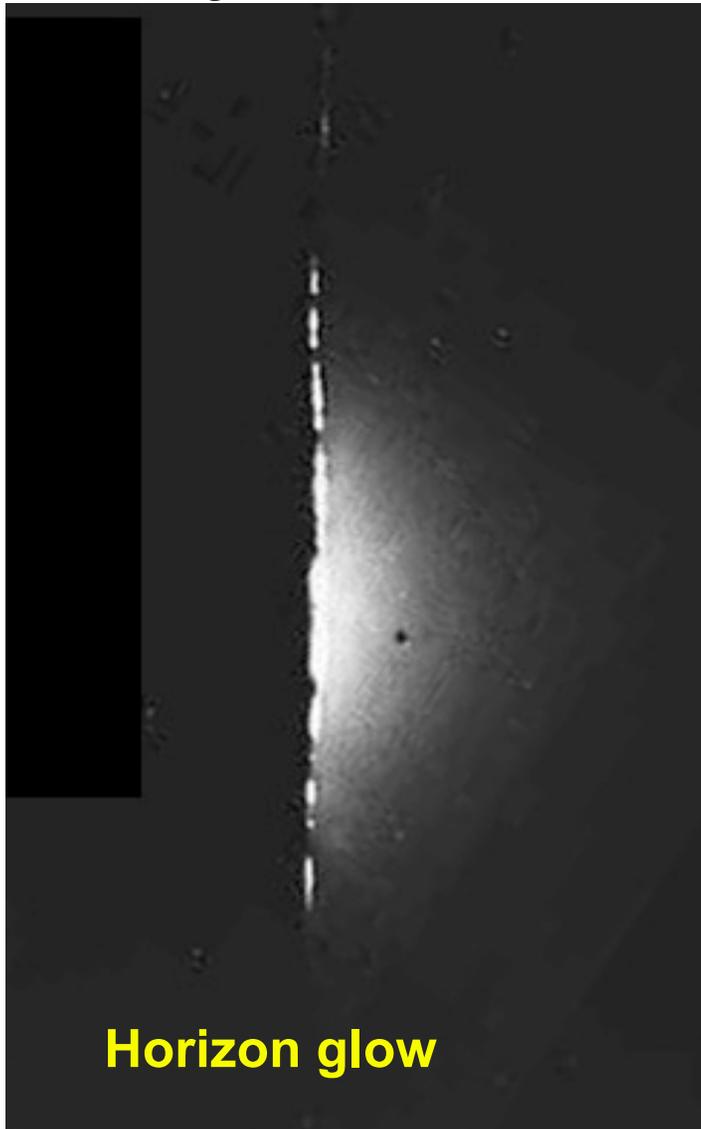
**Why is lunar dust so reactive, and hard to study?**



## **1. Surface Alteration**

**“Space Weathering”**: A complex set of processes which have resulted in a unique population of fines characterized by large surface area, and severely altered crystal structure.

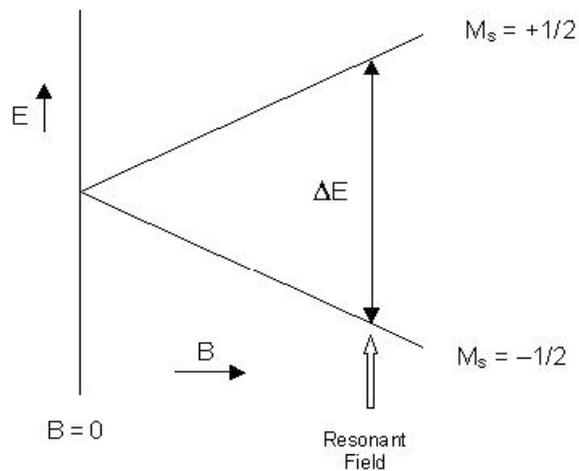
Why is lunar dust so reactive, and hard to study?



## 2. Radiation Environment

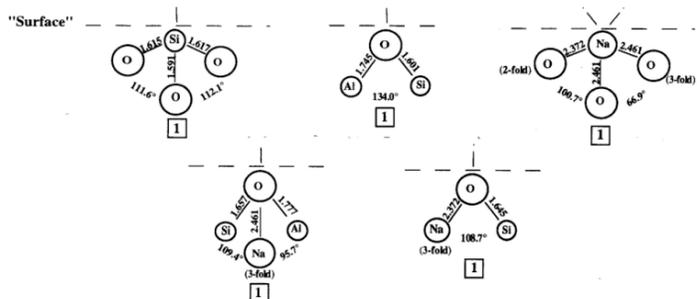
Damaged grain surfaces are bombarded by constantly-evolving charged particle and photon fluxes that further alter surface electronic structure. The resulting suite of reactive surface species are unique to the lunar regolith.

# Radical population is a measurable proxy for “reactivity”

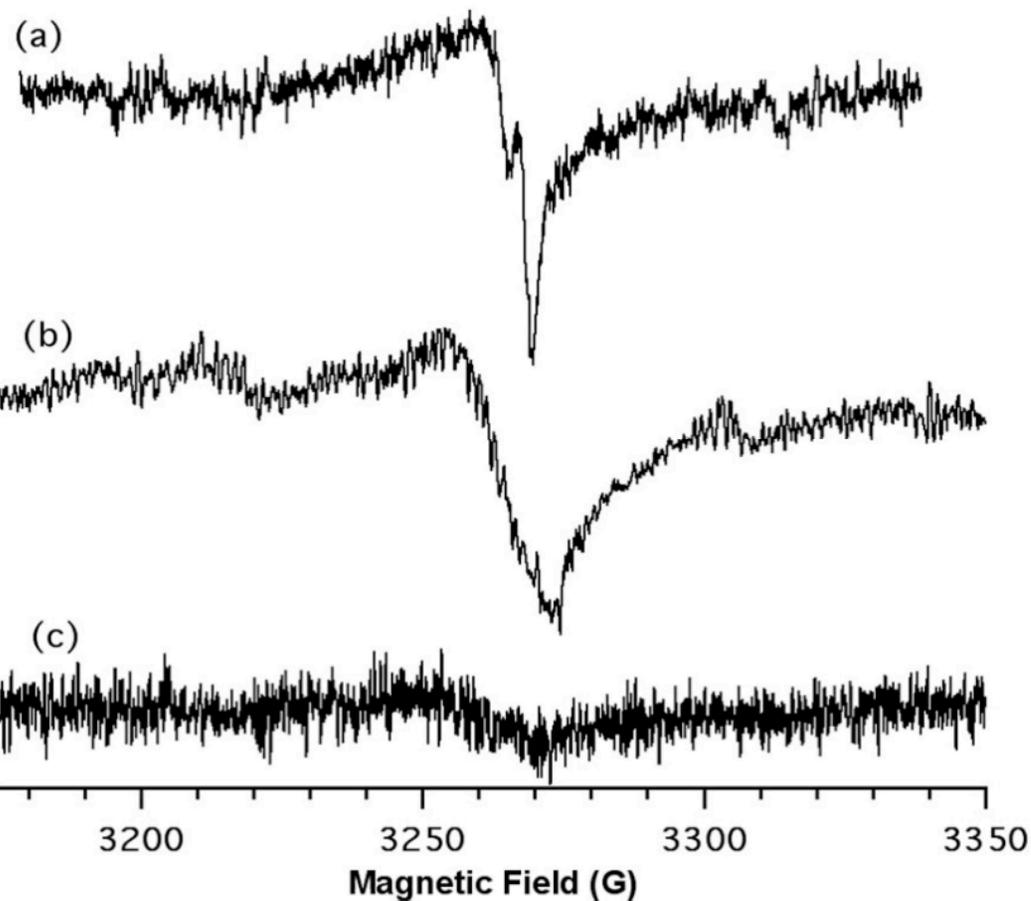
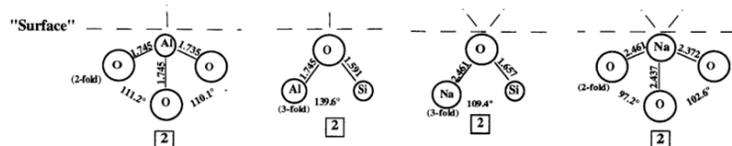


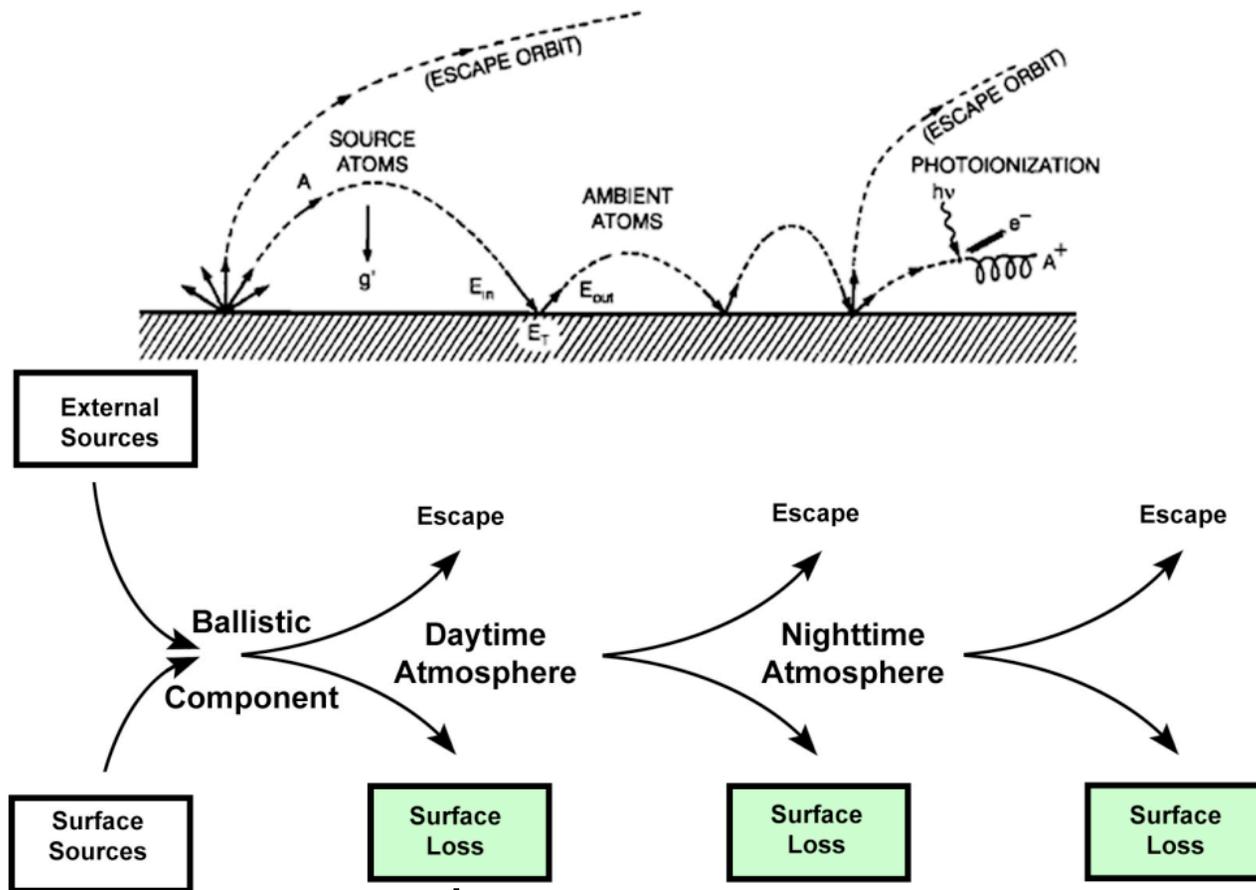
## Albite

### A. Albite {010}



### B. Albite {001}





## **Lunar regolith surface chemistry**

**Complex**

**Possible menacing**

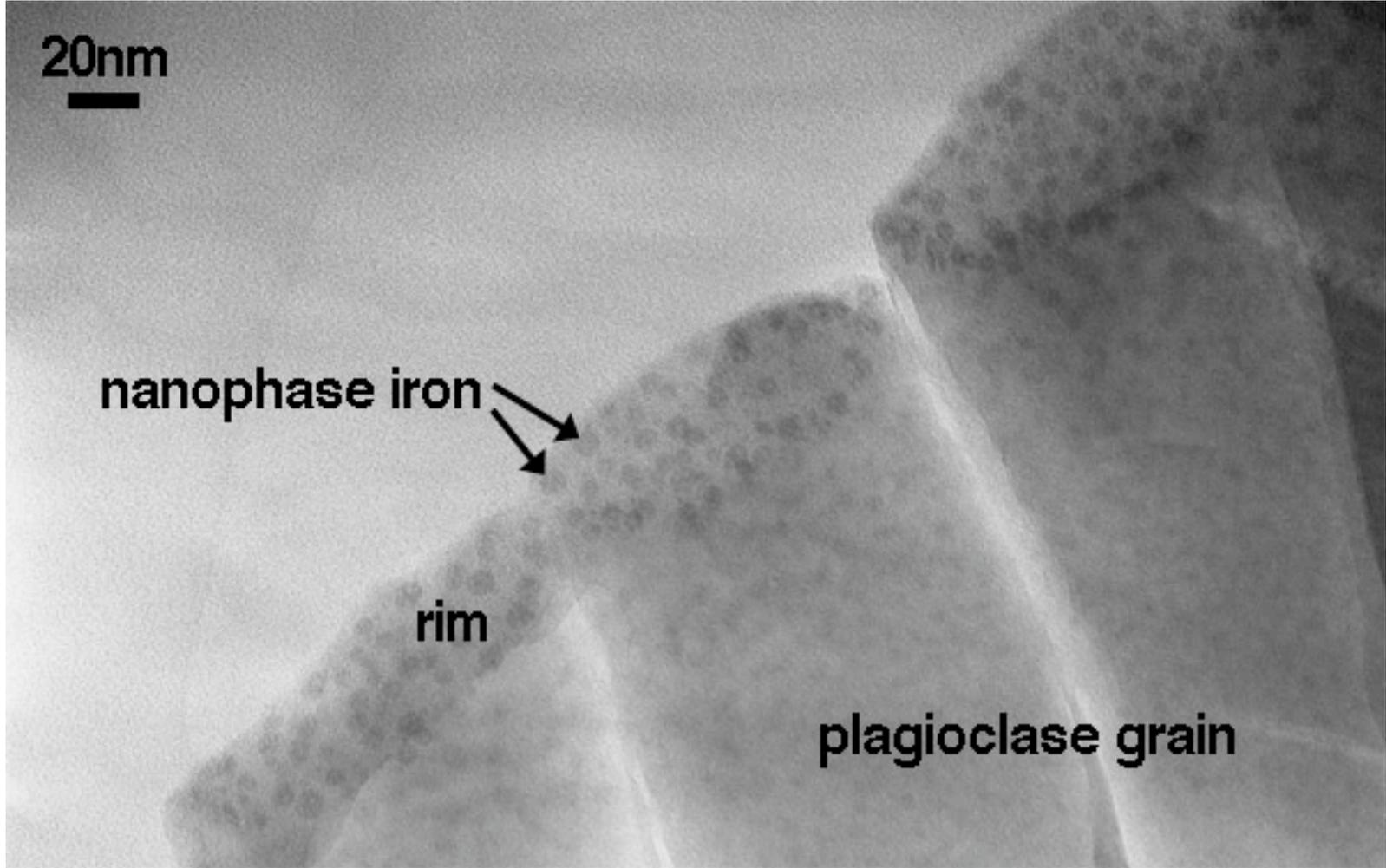
**Endemic to lunar surface**

**Neither uniform nor invariant**

**In Situ experimental study is essential**

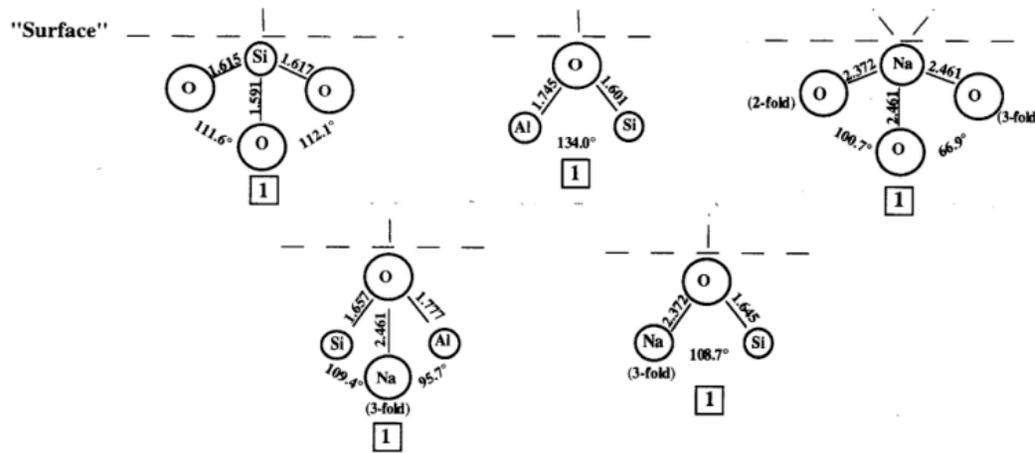
**Meaningful (whatever that means) laboratory simulations are prerequisite.**

# **Supplemental Slides**





A. Albite {010}



B. Albite {001}

