

**CONTROL ID:** 2255656

**TITLE:** Formation of water on warm dust grains

**ABSTRACT BODY:**

**Abstract Body:** The early stage of water formation on dust grains in the ISM depends on sticking and retention of atoms and molecules on surfaces of grains. We investigated the interaction of oxygen with amorphous silicates. We find that atomic oxygen is retained on an amorphous silicate surface with a much higher binding energy ( $1850\text{K} \pm 90\text{K}$ ) than previously estimated ( $800\text{K}$ ). We then used such value in the simulation of the chemical evolution of an interstellar environment – a molecular cloud edge in star-forming regions in Orion exposed to FUV illumination, and found that OH and  $\text{H}_2\text{O}$  formation on grains is considerably enhanced while  $\text{O}_2$  formation is suppressed because of the higher O binding energy. These effects are especially important in dense gas exposed to high FUV fields because of the wider temperature range in which oxygen can reside. Because of the higher binding energy, photodesorption controls the gas phase chemistry. Consequences of this discovery for observations will be discussed.

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**PRESENTATION TYPE:** Oral