# Reaction Pathways for Large Biomass Derivatives on Model Metal and Metal-Alloy Catalysts

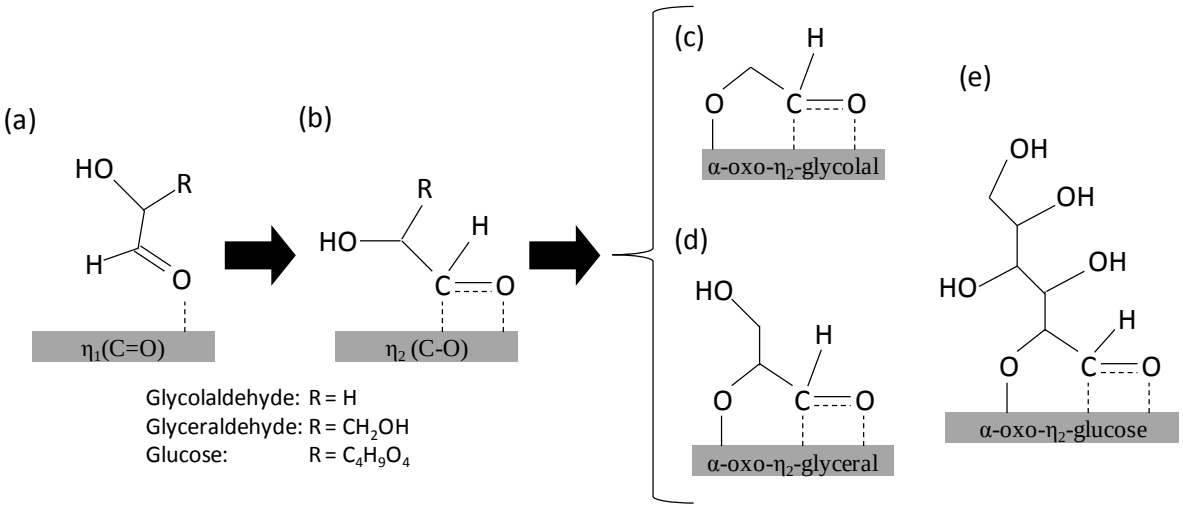
## Scientific Achievement

**Surface science techniques were used to elucidate adsorption configurations and stable intermediates in the reaction of glucose and related C2 and C3 oxygenates on Pt(111), Pd(111) and Ni/Pd(111) model catalysts.**

## Significance and Impact

**A fundamental understanding of the reaction pathways, intermediates and energetics for the conversion of large derivatives, as a function of metal structure and composition, facilitates the design of more active and selective catalysts for the production of fuels and chemicals from cellulosic biomass.**

## Research Details




- Glycolaldehyde, glyceraldehyde and glucose were dosed on model surfaces and studied with TPD, HREELS
- Demonstrated for the first time the chemistry: Glucose undergoes ring opening upon adsorption; Aldoses adsorb in an η1-aldehyde configuration with transition to an α-oxo-η2 specie prior to C-H bond cleavage
- Exp. results consistent with predictions from DFT