

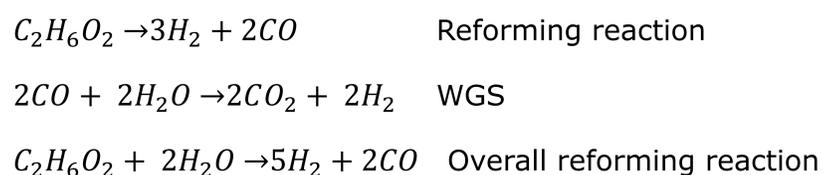
# Catalytic conversion of light oxygenates in hot compressed water



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Waste biomass streams offer suitable feedstock for production of sustainable fuels. Traditional methods, such as steam reforming, lacks efficient conversion of dilute aqueous and water soluble biomass feeds due to high energy consumption required for vaporization of water. Aqueous phase reforming (APR) enables catalytic conversion of low value biomass streams to hydrogen and alkanes. At moderate temperatures (225°C-450°C) water is kept in a liquid state by applying pressure (30-250bar) [1,2]. A suitable catalyst for APR should be active for C-C bond scission and should have suppressed activity for C-O bond cleavage. Under APR conditions hydrogen formation is thermodynamically favored by Water-Gas Shift (WGS) reaction, but it competes with alkane formation due to the C-O bond cleavage [2].



Pt-based catalysts on oxide supports are known for their good performance for these types of reactions [1,2]. Unfortunately, hydrothermal environment and properties of the feedstock in APR challenges the stability of the catalysts and can lead to support sintering and eventually the loss of active metal surface area, eventually leading to catalyst deactivation [2]. Carbon based supports, such as carbon nanofibers [2], have been reported to maintain their structure during

APR. However, carbon support has the disadvantage that it contains no sites, in contrast to oxides, for water activation needed for steam reforming reaction and WGS [2,3]. Therefore, bimetallic catalysts are needed for enhanced activity of the carbon supported catalysts [4].

Scope of this work is to investigate carbon supported noble and base metals for conversion of light oxygenates (C<sub>2</sub>-C<sub>4</sub>) to hydrogen. In order to achieve high selectivity to desired product information about surface chemistry is needed. Thus, to understand the mechanisms behind catalyst performance reaction studies are combined with ATR-IR spectroscopy.

## References:

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