

CLAIMS

1. A continuous process for converting carbohydrates, which can yield aldoses, to ethylene glycol, comprising the steps of:
 - (a) mixing carbohydrates into solution;
 - (b) adding hydrogen to a reactor;
 - (c) passing the carbohydrate mixture through the reactor at an elevated temperature, said reactor having a first zone comprising a retro-aldol catalyst and a second zone that contains a reduction catalyst;
 - (d) converting the aldoses in the first zone into at least glycolaldehyde by the retro-aldol catalyst in the first zone;
 - (e) converting the glycolaldehyde to ethylene glycol in the second zone of the reactor;
 - (f) removing the reaction products from the reactor;
 - (g) optionally recycling a portion of the reactor effluent back to the reactor to be used as reaction solvent or using recovered glycol for the solvent; and
 - (h) recovering the ethylene glycol.
2. The process of claim 1, wherein the reactor comprises a combined retro-aldol catalysis and reduction zone after the retro-aldol zone.
3. The process of claim 1, wherein a preheated zone prior to the catalysis zone hydrolyzes the carbohydrates at least partially to monosaccharides.
4. The process of claim 1, wherein the reduction catalyst is selected from the group consisting of nickel-rhenium (Ni/Re) and nickel-iridium (Ni/Ir).

5. A continuous process for converting carbohydrates, which can yield ketoses, to propylene glycol, comprising the steps of:

- (a) mixing carbohydrates into solution;
- (b) adding hydrogen to the reactor;
- (c) passing the carbohydrate mixture through a reactor at an elevated temperature, said reactor having a first zone comprising a retro-aldol catalyst and a second zone comprising a reducing catalyst;
- (d) converting the ketoses in the first zone into an aldehyde and possibly other carbonyl containing intermediates by the retro-aldol catalyst in the first zone;
- (e) converting the intermediates to propylene glycol in the second zone of the reactor;
- (f) removing the reaction products from the reactor; and
- (g) optionally recycling a portion of the reactor effluent back to the reactor to be used as reaction solvent; or using recovered glycol for the solvent and
- (h) recovering the propylene glycol.

6. The process of claim 6, wherein the reduction catalyst is selected from the group consisting of nickel-rhenium (Ni/Re) and nickel-iridium (Ni/Ir).

7. The process of claim 1, further comprising the step of using ethylene glycol as a portion of the solvent for the reaction.