CLAIMS

1. A process comprising

(a) providing a first stream comprising water, methacrolein, methanol, dimethylamine, and acetic acid to a phase separator, with the proviso that the first stream comprises at least 8 weight percent water;

(b) allowing the first stream to phase separate into an organic phase that comprises primarily methacrolein and an aqueous phase that comprises primarily water;

(c) distilling the organic phase in a dehydration column to produce a product stream comprising primarily methacrolein.

2. The process of claim 1 wherein the first stream is primarily a liquid stream and comprises at least 10 weight percent water.

3. The process of any of the preceding claims wherein the product stream comprises less than 2 weight percent water based on the weight of the product stream.

4. The process of any of the preceding claims wherein the product stream comprises less than 1 weight percent water based on the weight of the product stream.

5. The process of any of the preceding claims wherein the product stream comprises less than 0.5 weight percent water based on the weight of the product stream.

6. The process of any of the preceding claims wherein the product stream is recovered as a side draw stream or as a bottoms stream of the dehydration column.

7. The process of any of the preceding claims wherein an overhead stream is taken from the dehydration column, and wherein the process further comprises (d) sending at least part of the dehydration column overhead stream to a phase separator.

8. The process of any of the preceding claims wherein the product stream is recovered as a bottoms stream of the dehydration column.

9. The process of any of the preceding claims wherein the dehydration column is operated as a stripper.

10. The process of any of the preceding claims further comprising providing the product stream to a process comprising contacting methacrolein with methanol and an oxygen-containing gas in the presence of a catalyst under reaction conditions sufficient to produce MMA.

11. The process of any of the preceding claims wherein the first stream is prepared by converting propionaldehyde to methacrolein.

12. The process of claim 11 wherein the propionaldehyde is produced, at least in part, by contacting ethylene with CO and H_2 in the presence of a hydroformylation catalyst under reaction conditions sufficient to produce the propionaldehyde.

13. The process of claim 7 further comprising:

(e) distilling in a 2nd distillation column the aqueous phase from the phase separator to produce (1) a 2nd distillation column bottoms stream comprising primarily water and (2) a 2nd distillation column overhead stream;

(f) sending at least part of the 2nd distillation column overhead stream to a phase separator.

14. A process for the preparation of MMA, the process comprising:

(1) contacting ethylene with CO and H_2 in the presence of a hydroformylation catalyst under reaction conditions sufficient to produce propionaldehyde;

(2) contacting at least a portion of the propionaldehyde with formaldehyde in the presence of a catalyst containing dimethylamine and acetic acid to produce methacrolein, the methacrolein being in a first stream comprising water, the methacrolein, methanol, dimethylamine, and acetic acid, with the proviso that the first stream comprises at least 10 weight percent water;

(3) providing at least a portion of the first stream to a phase separator;

(4) allowing at least a portion of the first stream to phase separate in the phase separator into an organic phase that comprises primarily methacrolein and an aqueous phase that comprises primarily water;

(5) distilling at least a portion of the organic phase in a dehydration column to produce a product stream comprising primarily methacrolein, the product stream comprising less than 2 wt% water; and

(6) providing at least a portion of the product stream to a process comprising contacting the

methacrolein with methanol and an oxygen-containing gas in the presence of an oxidative esterification catalyst under reaction conditions sufficient to produce MMA.

15. The process of claim 14 wherein the product stream comprises less than 0.5 weight percent water based on the weight of the product stream.

16. The process of any of the preceding claims wherein the organic phase is fed to the top half of the dehydration column, preferably to the top of the dehydration column.