What is claimed is:

1. A process for purifying a dicarboxylic acid comprising

a) ozonizing a mixture comprising an ethylenically unsaturated compound having between 6 to 24 carbons with an ozone-containing gas to form a plurality of ozonization products;

b) cleaving the plurality of ozonization products under oxidative conditions in the presence of a suitable catalyst to form mixed oxidation products, wherein the mixed oxidation products comprises a mixture of C2 to C22 monocarboxylic acids and C2 to C22 dicarboxylic acids that includes the dicarboxylic acid;

c) distilling the mixed oxidation products to provide a first distillate comprising a portion of the C2 to C22 monocarboxylic acids, and a first residue of the mixed oxidation products, wherein the residue of the first mixed oxidation products comprises the dicarboxylic acid and a plurality of impurity acids;

d) distilling the first residue of the mixed oxidation products to provide a second distillate and a second residue of the mixed oxidation products, wherein the second distillate comprises the dicarboxylic acid and a first fraction of the plurality of impurity acids;

e) partitioning the second distillate between water and an organic solvent, wherein the water is at a temperature within the range of ~~about~~ 175°F, (79°C) to ~~about~~ 230°F, (110°C); wherein the organic solvent is substantially immiscible with water and has a water solubility of less than 0.5 grams per liter at 20°C; wherein water and the organic solvent are substantially immiscible to thereby form an aqueous layer containing the dicarboxylic acid and an organic solvent layer containing a second fraction of the plurality of impurity acids;

f) separating the organic solvent layer from the aqueous layer;

g) lowering the temperature of the aqueous layer to crystallize at least a portion of the dicarboxylic acid from the water layer to provide a crystallized dicarboxylic acid solid and a mother liquor containing uncrystallized dicarboxylic acid and a major portion of the second fraction of the plurality of impurity acids;

h) separating the crystallized dicarboxylic acid solid from the mother liquor to provide a first batch of the dicarboxylic acid comprising the crystallized dicarboxylic acid solid;

i) melting the first batch of the dicarboxylic acid to form a liquid comprising the dicarboxylic acid; and

j) distilling the liquid comprising the dicarboxylic acid to provide a purified dicarboxylic acid. wherein the distilling the liquid comprising the dicarboxylic acid comprises a first distilling stage and a second distilling stage, wherein the first distilling stage includes distilling the liquid comprising the dicarboxylic acid to remove a first distillate fraction to provide a first residue of the liquid, and the second distilling stage includes distilling the first residue of the liquid to provide the purified dicarboxylic acid.

2. The process of claim 1, wherein the lowering the temperature of the water layer comprises cooling the water layer in a plurality of cooling stages.

3. The process of according to claims 1 or 2, wherein lowering the temperature of the water layer comprises a first cooling stage temperature within a range from ~~about~~ 140°F, (60°C) to ~~about 105°C,~~ 105°F (41°C), and a second stage cooling temperature within a range from ~~about~~ 100°F, (38°C) to ~~about~~ 65 °F, (18°C); and wherein a residence time of the water layer in any cooling stage is 20 minutes to 120 minutes.

~~4. The process according to claims 2 or 3, wherein a residence time of the water layer in any cooling stage is about 20 minutes to about 120 minutes.~~

~~5. The process according to any of the claims 1 to 4, wherein the distilling the liquid comprising the dicarboxylic acid comprises a first distilling stage and a second distilling stage, wherein the first distilling stage includes distilling the liquid comprising the dicarboxcylic acid to remove a first distillate fraction to provide a first~~

~~residue of the liquid, and the second distilling stage includes distilling the first residue of the liquid to provide the purified dicarboxylic acid.~~

~~6.~~4. The process according to any of the claims 1 to ~~5~~ 3, further comprising

k) evaporating at least a portion of the water from the mother liquor to form a concentrated mother liquor; and

l) isolating the uncrystallized dicarboxylic acid from the concentrated mother liquor to provide a second batch of the dicarboxylic acid.

~~7.~~5. The process of claim ~~6~~ 4, wherein the isolating the uncrystallized dicarboxylic acid comprises distilling the concentrated mother liquor to provide the second batch of the dicarboxylic acid~~.~~; or wherein the isolating the uncrystallized dicarboxylic acid comprises crystallizing at least a portion of the uncrystallized dicarboxylic acid from the concentrated mother liquor to provide the second batch of the dicarboxylic acid.

~~8. The process of claim 6, wherein the isolating the uncrystallized dicarboxylic acid comprises crystallizing at least a portion of the uncrystallized dicarboxylic acid from the concentrated mother liquor to provide the second batch of the dicarboxylic acid.~~

~~9.~~6. The process of claim ~~6~~ 4, wherein the isolating the uncrystallized dicarboxylic acid comprises decreasing a temperature of the concentrated mother liquor below a melting point of uncrystallized dicarboxylic acid to provide a solidified product and flaking the solidified product.

~~10.~~7. The process according to any of the claims ~~6~~ 4 to ~~9~~ 6, further comprising:

m) combining at least a portion of the first and second batches of the dicarboxylic acid prior to distilling the liquid comprising the dicarboxylic acid.

~~11. The process according to any of the claims 1 to 10, wherein the purified dicarboxylic acid comprises less than 3 wt% of a monocarboxylic acid, wherein the wt% is based on the total weight of the purified dicarboxylic acid.~~

~~12. The process according to any of the claims 1 to 10, wherein the purified dicarboxylic acid comprises less than 0.05 wt% of a monocarboxylic acid, wherein the wt% is based on the total weight of the purified dicarboxylic acid.~~

~~13.~~8. The process according to any of the claims 1 to ~~12~~ 7, wherein the organic solvent is a recycled organic solvent provided by a method comprising distilling the organic solvent layer containing the mixture of C9 to C22 monocarboxylic acids to provide a recycled organic solvent, wherein the recycled organic solvent has a content of C9 to C22 monocarboxylic acids in an amount that is less than 1 percent by weight.

~~14.~~9. The process according to claim ~~13~~ 8, wherein the content of C9 to C22 monocarboxylic acids in the recycled organic solvent is less than 0.1 percent by weight, or less than 0.05 percent by weight.

~~15. The process according to any of the claims 13 to 14, wherein the content of C9 to C22 monocarboxylic acids in the recycled organic solvent is less than 0.05 percent by weight.~~

~~16.~~10. The process according to any of the claims 1 to ~~15~~ 9, wherein the aqueous layer contains less than 1 percent by weight of the organic solvent prior to any subsequent processing step.

~~17.~~11. The process according to any of the claims ~~13~~ 8 to ~~16~~ 10, wherein the distilling the organic solvent layer comprises:

1) transferring the organic solvent layer comprising the organic solvent and the mixture of C9 to C22 monocarboxylic acids to a first distillation unit, wherein

the organic solvent and the mixture of C9 to C22 monocarboxylic acids are separated by forming an organic solvent vapor; and

2) condensing the organic solvent vapor to form the recycled organic solvent.

~~18.~~12. The process according to claim ~~17~~ 11, wherein the organic solvent vapor further comprises water, which is subsequently removed from the recycled organic solvent.

~~19. A chemical derivative of the dicarboxylic acid obtained from the process according to any of the claims 1 to 18.~~