Claims:

1. Process for producing ester mixtures comprising $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$ by reaction of $A(COOH)_{x+1}$ or derivatives thereof which contain no ester groups COOR having a radical R whose alcohol ROH has a higher boiling point at a defined pressure than the alcohol R^1OH of the radical R^1 at the same pressure, with an amount $(m_1 + s_1)$ of R^1OH and an amount m_2 of R^2OH, the reaction mixture being heated at boiling, and**

A is an aromatic, alicyclic or aliphatic radical,

x is 1 or 2,

R^1 and R^2 independently of one another are substituted or unsubstituted aryl radicals or linear or branched, substituted or unsubstituted alkyl radicals having 3 to 20 carbon atoms, the alcohol R^1OH having a lower boiling point at a defined pressure than the alcohol R^2OH at the same pressure,

m_1 and m_2 correspond to the mole equivalents of the alcohol radicals OR^1 and OR^2 to be introduced into $A(COOH)_{x+1}$ or derivatives thereof, and

s_1 is greater than 0.

2. Process according to Claim 1, characterized in that the ester mixture is a mixture of phthalic acid, terephthalic acid, isophthalic acid, 1,2-, 1,3- or 1,4-cyclohexanedicarboxylic acid, adipic acid, sebacic acid, maleic acid, succinic acid, furandicarboxylic acid or citric acid.

3. Process according to either of Claims 1 and 2, characterized in that R^1 and R^2 independently of one another are selected from alkyl radicals which contain 3 to 20, preferably 4 to 15 and more particularly 5 to 11 carbon atoms, the alkyl radicals preferably having no other functional groups, including multiple bonds.

4. Process according to any of Claims 1 to 3, characterized in that R^1 and R^2 independently of one another are selected from propyl, butyl, *tert*-butyl, *iso*butyl, 2-methylbutyl, 3-methylbutyl, *n*-pentyl, *iso*pentyl, hexyl, heptyl, *iso*heptyl, octyl,

*iso*octyl, 2-ethylhexyl, nonyl, *n*-nonyl, *iso*nonyl, decyl, *iso*decyl, 2-propylheptyl, undecyl and tridecyl radicals.

5. Process according to any of Claims 1 to 4, characterized in that the boiling points of the alcohols R^1OH and R^2OH differ by at least 10°C, preferably by at least 25°C and more particularly by at least 40°C.

6. Process according to any of Claims 1 to 5, characterized in that the amount s_1 is less than $m_1 + m_2$, preferably less than $0.6 \cdot (m_1 + m_2)$, more preferably less than $0.5 \cdot (m_1 + m_2)$ and more particularly less than $0.4 \cdot (m_1 + m_2)$ and/or the amount s_1 is greater than $0.05 \cdot (m_1 + m_2)$, preferably greater than $0.1 \cdot (m_1 + m_2)$ and more particularly greater than $0.15 \cdot (m_1 + m_2)$.

7. Process according to any of Claims 1 to 6, characterized in that a catalyst is used in the process and the amount of R^1OH in the reaction mixture has been lowered to less than 20 mol%, preferably to less than 15 mol%, more preferably to less than 10 mol% and more particularly to less than 5 mol%, based on the excess amount s_1 of the alcohol R^1OH, before the catalyst is destroyed.

8. Process according to any of Claims 1 to 7, characterized in that it provides an ester mixture in which the molar ratio of the esters $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$ for x = 1 deviates by less than 15 points, preferably by less than 10 points, from the statistically determined expectation value which arises on assumption of complete incorporation of the alcohol radicals OR^2, this points value corresponding to the sum total of all amounts of the differences between statistical expectation value and actual molar fraction of each individual ester in the ester mixture in the event that the sum total of the molar fractions of the abovementioned esters in the ester mixture adds up to 100.

9. Process according to any of Claims 1 to 7, characterized in that it provides an ester mixture in which the molar ratio of the esters $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ und $A(COOR^2)(COOR^2)_x$ for x = 2 deviates by less than 25 points, preferably by less than 15 points, more particularly by less than 10 points from the statistically determined expectation value which arises on assumption of complete incorporation of the alcohol radicals OR^2, this

~~points value corresponding to the sum total of all amounts of the differences between statistical expectation value and actual molar fraction of each individual ester in the ester mixture in the event that the sum total of the molar fractions of the abovementioned esters in the ester mixture adds up to 100.~~

~~10. Process according to any of Claims 1 to 9, characterized in that the ester mixture is a mixture of phthalic acid, terephthalic acid or isophthalic acid and after optional work-up the ester mixture is hydrogenated in a subsequent process step.~~

~~11. Ester mixture produced by the process according to any of Claims 1 to 10.~~

~~12. Use of a process according to any of Claims 1 to 10 for setting processing-relevant and/or application-relevant properties of an ester mixture by controlling the quantitative distribution of the esters in the ester mixture.~~

~~13. Use of an ester mixture produced by any of the processes claimed by means of Claims 1 to 10 as a plasticizer, especially for PVC.~~

~~14. Use according to Claim 13, characterized in that the ester mixture is used as a plasticizer in adhesives, sealants, coating materials, paints, inks, plastisols, foams, synthetic leather, floorcoverings (e.g. top layer), roofing membranes, underbody protection, fabric coatings, cables, wire insulation, hoses, extruded articles, films, in the automotive interior area, in wallcoverings, liquid inks, toys, contact films, food packaging or medical articles, for example tubes or blood bags.~~

~~15. Composition comprising an ester mixture produced by any of the processes claimed by means of Claims 1 to 10, and comprising one or more polymers from the group consisting of polyvinyl chloride, copolymers of vinyl chloride with vinyl acetate or with butyl acrylate, polyalkyl methacrylate (PAMA), polyvinyl butyral (PVB), polyurethane, polysulphides, polylactic acid (PLA), polyhydroxybutyral (PHB) and nitrocellulose.~~

1. A process for producing an ester mixture, the process comprising:
reacting $A(COOH)_{x+1}$ or derivatives thereof, which contain no ester group COOR having a radical R whose alcohol ROH has a higher boiling point at a defined pressure than an alcohol R^1OH at the defined pressure, with the alcohol R^1OH and

an alcohol R^2OH in a reaction mixture comprising a catalyst, said reaction mixture being heated at boiling, to obtain a product mixture;

removing from the product mixture a portion of a residual amount of added alcohol R^1OH that does not react with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof; and then

destroying the catalyst to obtain an ester mixture comprising $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$,

wherein:

a molar equivalent amount ($m_1 + s_1$) of the alcohol R^1OH is added to the reaction mixture, and a molar equivalent amount (m_2) of the alcohol R^2OH is added to the reaction mixture;

(m_1) represents a theoretical molar equivalent of the alcohol R^1OH that reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof, on assumption that all of the alcohol R^2OH reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof and is incorporated into the ester mixture;

(s_1) is greater than zero, and represents a theoretical molar equivalent of the residual amount of the alcohol R^1OH that does not react with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof, on assumption that all of the alcohol R^2OH reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof and is incorporated into the ester mixture;

A is an aromatic, alicyclic or aliphatic radical;

x is 1 or 2;

R^1 and R^2 independently of one another are substituted or unsubstituted aryl radicals or linear or branched, substituted or unsubstituted alkyl radicals having 3 to 20 carbon atoms, the alcohol R^1OH having a lower boiling point at a defined pressure than the alcohol R^2OH at the same pressure;

the removing of the portion of the alcohol R^1OH from the product mixture lowers an amount of the alcohol R^1OH in the product mixture to less than 20 mol % of the residual amount (s_1) of the alcohol R^1OH, before the catalyst is destroyed; and

for x = 1, a molar fraction of the esters $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$ in the ester mixture deviates by less than 12 points from a statistically determined expectation value which arises when assuming that the entire molar equivalent

(m_2) of the alcohol R^2OH reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof, said 12 points corresponding to a sum total of all amounts of differences between statistical expectation value and actual molar fraction of each individual ester in the ester mixture when a sum total of molar fractions of esters in the ester mixture adds up to 100, or

for x = 2, a molar fraction of the esters $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$ in the ester mixture deviates by less than 25 points from a statistically determined expectation value which arises when assuming that the entire molar equivalent (m_2) of the alcohol R^2OH reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof, said 25 points corresponding to a sum total of all amounts of differences between statistical expectation value and actual molar fraction of each individual ester in the ester mixture when a sum total of molar fractions of esters in the ester mixture adds up to 100.

2. The process according to claim 1, wherein the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof is at least one selected from the group consisting of phthalic acid, terephthalic acid, isophthalic acid, 1,2-, 1,3- or 1,4-cyclohexanedicarboxylic acid, adipic acid, sebacic acid, maleic acid, succinic acid, furandicarboxylic acid and citric acid.

3. The process according to claim 1, wherein R^1 and R^2 independently of one another are alkyl radicals which contain 3 to 20 carbon atoms.

4. The process according to claim 1, wherein R^1 and R^2 independently of one another are alkyl radicals which contain 3 to 20 carbon atoms, said alkyl radicals having no other functional group.

5. The process according to claim 3, wherein R^1 and R^2 independently of one another are selected from the group consisting of propyl, butyl, *tert*-butyl, *iso*butyl, 2-methylbutyl, 3-methylbutyl, *n*-pentyl, *iso*pentyl, hexyl, heptyl, *iso*heptyl, octyl, *iso*octyl, 2-ethylhexyl, nonyl, *n*-nonyl, *iso*nonyl, decyl, *iso*decyl, 2-propylheptyl, undecyl and tridecyl radicals.

6. The process according to claim 1, wherein boiling points of the alcohols R^1OH and R^2OH differ by at least 10°C.

7. The process according to claim 1, wherein the amount (s_1) is less than an amount ($m_1 + m_2$), is greater than an amount $0.05 \cdot (m_1 + m_2)$, or both.

8. The process according to claim 1, wherein the removing of the portion of the alcohol R^1OH from the product mixture lowers the amount of the alcohol R^1OH in the product mixture to less than 15 mol% of the amount (s_1), before the catalyst is destroyed.

9. The process according to claim 1, wherein the molar fraction of the esters $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$ in the ester mixture, for x = 1, deviates by less than 10 points from the statistically determined expectation value which arises when assuming that the entire molar equivalent (m_2) of the alcohol R^2OH reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof, said 10 points corresponding to the sum total of all amounts of differences between statistical expectation value and actual molar fraction of each individual ester in the ester mixture when the sum total of molar fractions of esters in the ester mixture adds up to 100.

10. The process according to claim 1, wherein the molar fraction of the esters $A(COOR^1)(COOR^1)_x$, $A(COOR^1)(COOR^2)_x$, $A(COOR^2)(COOR^1)_x$ and $A(COOR^2)(COOR^2)_x$ in the ester mixture, for x = 2, deviates by less than 15 points from the statistically determined expectation value which arises when assuming that the entire molar equivalent (m_2) of the alcohol R^2OH reacts with the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof, said 15 points corresponding to the sum total of all amounts of differences between statistical expectation value and actual molar fraction of each individual ester in the ester mixture when the sum total of molar fractions of esters in the ester mixture adds up to 100.

11. The process according to claim 1, wherein: the compound of formula: $A(COOH)_{x+1}$ or derivatives thereof is phthalic acid, terephthalic acid or isophthalic acid; and after an optional work-up the ester mixture is subsequently hydrogenated.

12. An ester mixture produced by the process according to claim 1.

13. The process according to claim 1, further comprising: controlling a quantitative distribution of esters in the ester mixture.

14. A polymer plasticizer, comprising the ester mixture according to claim 12.

15. The polymer plasticizer according to claim 14, which is adapted to function as a plasticizer for a PVC.

16. An article, comprising the polymer plasticizer of claim 14, wherein said article is selected from the group consisting of a synthetic leather, a floorcovering, a roofing membrane, an underbody protection, a fabric coating, a cable, a wire insulation, a hose, an extruded article, a film, an automotive interior article, a wallcovering, a liquid ink, a toy, a contact sheet, a food packaging and a medical article.

17. A composition, comprising:
the ester mixture according to claim 12, and at least one selected from the group consisting of a polyvinyl chloride, a copolymer of vinyl chloride with vinyl acetate, a copolymer of vinyl chloride with butyl acrylate, a polyalkyl methacrylate (PAMA), a polyvinyl butyral (PVB), a polyurethane, a polysulfide, a polylactic acid (PLA), a polyhydroxybutyral (PHB) and a nitrocellulose.

18. A composition, comprising the polymer plasticizer of claim 14, wherein said composition is selected from the group consisting of an adhesive, a sealant, a coating material, a paint, an ink, a plastisol, and a foam.

19. A composition, comprising the ester mixture of claim 12 and a polymer.

20. The process according to claim 1, wherein the compound of formula: $A(COOH)_{x+1}$ is not terephthalic acid.

21. The process according to claim 1, comprising reacting a derivative of $A(COOH)_{x+1}$ with the alcohol R^1OH and an alcohol R^2OH.