Claims:

1. A method for preparing a purified styrene composition, wherein the method comprises the following steps:
   a) providing a crude hydrocarbon composition containing styrene,
   b) subjecting the crude hydrocarbon composition provided in step a) to a distillation in a divided-wall column (14) so as to produce an overhead hydrocarbon stream, a bottom hydrocarbon stream and a side hydrocarbon stream and
   c) subjecting the side hydrocarbon stream obtained in step b) to at least one crystallization step so as to obtain a purified styrene composition.

2. The method of claim 1, wherein the crude hydrocarbon composition provided in step a) is subjected in step b) to a distillation in a middle divided-wall column (14).

3. The method of claim 1 or 2, wherein the overhead hydrocarbon stream obtained in step b) is a C_{7-}-hydrocarbon stream, the bottom hydrocarbon stream obtained in step b) is a C_{9+}-hydrocarbon stream and the side hydrocarbon stream obtained in step b) is a styrene containing hydrocarbon stream.

4. The method of any of the preceding claims, wherein the side hydrocarbon stream obtained in step b) and subjected in step c) to at least one crystallization step contains at least 80% by weight, preferably at least 90% by weight, more preferably at least 98% by weight and most preferably at least 99% by weight of styrene.

5. The method of any of the preceding claims, wherein the crude hydrocarbon composition provided in step a) as well as the side hydrocarbon stream obtained in step b) contain one or more impurities selected from the group consisting of color inducing species, sulfur species, meta- and ortho-xylenes, ethylbenzene, phenylacetylene, cumene, n-propylbenzene, alpha-

methylstyrene, ethyltoluene, organo-chlorinated, organo-nitrogenated species and arbitrary mixtures of two or more of the aforementioned impurities.

6. The method of claim 5, wherein the crude hydrocarbon composition provided in step a) as well as the side hydrocarbon stream obtained in step b) contain as impurities one or more sulfur species and preferably one or more sulfur species selected from the group consisting of mercaptans, disulfides, thiophenes having a boiling point of 130 to 150°C and arbitrary combinations of two or more thereof.

7. The method of claim 5 or 6, wherein the crude hydrocarbon composition provided in step a) as well as the side hydrocarbon stream obtained in step b) contain as impurities comprise one or more color inducing species comprising at least one of conjugated diolefins, oxygenated species, and oxygenated sulfur species.

8. The method of any of the preceding claims, wherein the at least one crystallization step comprises at least one static melt crystallization stage and at least one dynamic melt crystallization stage, wherein preferably the at least one dynamic crystallization stage is a falling film melt crystallization stage.

9. The process according to any of the preceding claims, wherein the crude hydrocarbon composition provided in step a) is a pygas and preferably has been obtained by pyrolyzing an ethylbenzene and styrene containing stream produced in an ethyl-benzene/styrene monomer (EBSM) process, by pyrolyzing a hydrocarbon stream obtained in a naphtha cracker or by pyrolyzing polystyrene, preferably recycled polystyrene.

10. The method of any of the preceding claims, wherein the purified styrene composition has a styrene content of at least 99.00% by weight, preferably of at least 99.50% by weight, more preferably of at least 99.80% by weight, still more preferably of at least 99.90% by weight, yet more preferably of at least 99.95% by weight and most preferably of at least 99.98% by weight.

11. The method of any of the preceding claims, wherein the purified styrene composition fulfils one or more of the below criteria.
    i) has a color of maximum 15 as defined by Pt-Co scale as per ASTM D5386,
    ii) comprises less than 2 ppmw of total elemental sulfur as contained in mercaptans, disulfides and thiophenes,
    iii) comprises less than 20 ppmw of oxygenates,
    iv) comprises less than 40 ppmw of impurities selected from the group consisting of phenylacetylene, mixed xylenes, ethylbenzene, cumene, ethyltoluene, n-propylbenzene, and alpha-methylstyrene,
    v) has polymer content of less than 10 ppmw,
    vi) has total organic chlorine content of less than 2 ppmw.

12. A plant (10) for preparing a purified styrene composition comprising at least one divided-wall column (14) and at least one crystallization block (16), wherein the divided-wall column (14) comprises an inlet line (20) for a crude hydrocarbon composition containing styrene, a line for overhead hydrocarbon stream (22), a line for bottom hydrocarbon stream (24) and a line for side hydrocarbon stream (26), wherein the at least one crystallization block (16) comprises an inlet line (26), wherein the line for side hydrocarbon stream of the divided-wall column (14) is the inlet line (26) of the at least one crystallization block (16), and wherein the at least one crystallization block (16) comprises two or more static crystallization stages (40a, 40b) and two or more dynamic crystallization stages (36a, 36b, 36c, 36d).

13. The plant (10) of claim 12, wherein the divided-wall column (14) is a middle divided-wall column (14), wherein the dividing wall (28) of the middle divided-wall column (14) extends, seen over the height, which is the straight distance between the bottom and the top of the middle divided-wall column (14), essentially vertically downwards from 10 to 90%, preferably from 20 to 80%, more preferably from 30 to 70% and most preferably from 40 to 60% of the height of the middle divided-wall column (14), wherein essentially vertically downwards means that the angle between the dividing wall (14) and the length

axis of the middle divided-wall column (14) is at most 20°, preferably at most 10°, more preferably at most 5° and most preferably 0°.

14. The plant (10) of claim 12 or 13, which further comprises a pyrolysis or catalytic reactor unit block (12) comprising an inlet line (18) and an outlet line (20), wherein the outlet line (20) of the pyrolysis or catalytic reactor unit block (12) is the inlet line (20) of the divided-wall column (14).

15. The plant (10) of any of claims 12 to 14, wherein the crystallization block (16) comprises:
at least one static crystallization section (38) comprising two to five static crystallization stages (40a, 40b),
at least one dynamic crystallization section (34) comprising two to five dynamic crystallization stages (36a, 36b, 36c, 36d) and
at least two conduits (46, 50) that fluidly couple at least one of the static crystallization stages (40a, 40b) with at least one of the one or more dynamic crystallization stages (36a, 36b, 36c, 36d), wherein one of the at least two conduits (46, 50) fluidly couples one of the static crystallization stages (40a, 40b) with one of the dynamic crystallization stages (36a, 36b, 36c, 36d) so that a styrene depleted residue fraction obtained in the dynamic crystallization stage (36a, 36b, 36c, 36d) may be fed into the static crystallization stage (40a, 40b) being fluidly coupled with the dynamic crystallization stage (36a, 36b, 36c, 36d), and wherein one of the at least two conduits (46, 50) fluidly couples the static crystallization stage (40a, 40b) with the dynamic crystallization stage (36a, 36b, 36c, 36d) being fluidly coupled with the static crystallization stage (40a, 40b) so that a styrene enriched crystallized fraction obtained in the static crystallization stage (40a, 40b) may be fed into the dynamic crystallization stage (36a, 36b, 36c, 36d), wherein each two of the remaining static crystallization stages (40a, 40b) are fluidly coupled with each other by means of at least two conduits (56, 58), and wherein each two of the remaining dynamic crystallization stages (36a, 36b, 36c, 36d) are fluidly coupled with each other by means of at least two conduits (52a,54a,52b,54b,52c,54c).