CLAIMS

1. A process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder, said process comprising the following steps:

(a) preparing a suspension comprising micronized recycled rubber powder, water and at least one surfactant;

(b) mixing the suspension obtained in step (a) with at least one styrene-butadiene latex to obtain a styrene-butadiene latex comprising micronized recycled rubber powder;

(c) subjecting the latex obtained in step (b) to coagulation to obtain a coagulated styrene-butadiene rubber comprising micronized recycled rubber powder;

wherein:

- in step (a) the particle size of said micronized recycled rubber powder is ranging from 0.05 mm to 0.8 mm, preferably ranging from 0.1 mm to 0.4 mm;
- in step (a) said at least one surfactant is present in an amount ranging from 0.5% by weight to 3% by weight, preferably ranging from 1% by weight to 2.5% by weight, with respect to the total weight of said recycled rubber powder;
- in step (a) said micronized recycled rubber powder has a concentration in water ranging from 1% by weight to 50% by weight, preferably ranging from 5% by weight to 30% by weight, with respect to the total weight of said water.

2. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to claim 1, wherein in step (a) said at least a surfactant is selected from:

- non-ionic surfactants such as polyoxyethylene derivatives of fatty acids, alkyl-polyglucosides, ethanolamides, ethoxylated amides, ethoxylated amines, ethoxylated acids, polyoxyethylene alkyl-ethers, or mixtures thereof; and / or
- anionic surfactants such as: salts formed by carbon atom long chains terminated with a carboxylate or sulfonate group [such as sodium lauryl sulfate (SLS), sodium lauryl ethoxy sulfate (SLES)], alkyl- benzene-sulphonic acids (ABS), polysulfonated aromatic ethers, or mixtures thereof; sodium, potassium, lithium, or ammonium salts, preferably sodium or potassium, of fatty acids, saturated or unsaturated, containing from 6 to 22 carbon atoms in the molecule such as caproic acid, lauric acid, myristic acid, palmitic acid, stearic acid, oleic acid, linoleic acid, linolenic acid, or mixtures thereof, or mixtures of said salts; sodium, potassium, lithium, or ammonium salts, preferably sodium or potassium, of modified resin acids which are obtained by dimerization, disproportionation, hydrogenation, modification of resin acid mixtures

containing abietic acid, neoabietic acid, palustric acid, levopimaric acid, or mixtures thereof, or mixtures of said salts; and/or

- cationic surfactants such as long-chain quaternary ammonium salts [such as benzalkonium chloride (BAC), cetyl-trimethylammonium bromide (CTAB), hexadecyltrimethylammonium bromide], or mixtures thereof; and/or
- amphoteric surfactants such as coco-amidopropyl-betaine, dodecylbetaine, lecithin, aminocarboxylic acids, or mixtures thereof.

3. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to claim 1 or 2, wherein said step (a) is carried out at a temperature ranging from 20°C to 90°C, preferably ranging from 50°C to 80°C, for a variable time depending on the size of the mixer and sufficient to obtain a homogeneous suspension, preferably for a time ranging from 5 minutes to 60 minutes, preferably ranging from 10 minutes to 40 minutes.

4. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein in said step (b) said at least one styrene-butadiene latex has an amount of styrene-butadiene polymer ranging from 10% by weight to 50% by weight, preferably ranging from 15% by weight to 30% by weight, with respect to the total weight of said latex and an amount of linked styrene ranging from 10% by weight to 60% by weight, preferably ranging from 20% by weight to 50% by weight, with respect to the total weight of said latex.

5. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein in said step (b) the suspension obtained in step (a) is added in such an amount to have an amount of micronized recycled rubber powder ranging from 5% by weight to 95% by weight, preferably ranging from 8% by weight to 35% by weight, with respect to the total weight of the styrene-butadiene rubber contained in the latex.

6. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein said step (b) is carried out at a temperature ranging from 20°C to 90°C, preferably ranging from 50°C to 80°C, for a variable time depending on the size of the mixer and sufficient to obtain a styrene-butadiene latex comprising micronized recycled rubber powder, wherein said powder is homogeneously distributed in the latex, preferably for a period of time ranging from 1 minute to 45 minutes, preferably ranging from 5 minutes to 15 minutes.

7. A process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder comprising the following steps:

(al) preparing a suspension comprising micronized recycled rubber powder, water and at least one surfactant;

(cl) mixing the suspension obtained in step (a) with at least one styrene-butadiene latex and subjecting the whole to coagulation to obtain a coagulated styrene-butadiene rubber comprising micronized recycled rubber powder;

wherein:

- in step (al) the particle size of said micronized recycled rubber powder is ranging from 0.05 mm to 0.8 mm, preferably ranging from 0.1 mm to 0.4 mm;
- in step (al) said at least one surfactant is present in an amount ranging from 0.5% by weight to 3% by weight, preferably ranging from 1% by weight to 2.5% by weight, with respect to total weight of said micronized recycled rubber powder;
- in step (al) said micronized recycled rubber powder has a concentration in water ranging from 1% by weight to 50% by weight, preferably ranging from 5% by weight to 30% by weight, with respect to the total weight of said water.

8. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to claim 7, wherein said step (al) is carried out according to claim 2 or 3.

9. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein said step (c) and step (cl) are carried out in the presence of at least one coagulation agent selected from alkylamine-epichloridine copolymers.

10. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein said step (c) and step (cl) are carried out at a temperature ranging from 40°C to 90°C, preferably ranging from 60°C to 80°C, for a variable time depending on the size of the coagulation mixer, the amount of suspension obtained in step (a) or step (al) and of the used styrene-butadiene latex, the temperature and the pH, the used stirring system, preferably for a time ranging from 5 minutes to 120 minutes, preferably ranging from 10 minutes to 60 minutes.

11. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein said step

(c) and step (cl) are carried out at a pH lower than or equal to 5, preferably ranging from 2.5 to 4.

12. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein at least one inorganic acid such as sulfuric acid, phosphoric acid is added in said step (c) and step (cl), preferably sulfuric acid, said at least one inorganic acid being added in such an amount to maintain the pH lower than or equal to 5, preferably ranging from 2.5 to 4, for the entire duration of said step (c) and step (cl).

13. The process for the preparation of a styrene-butadiene rubber comprising micronized recycled rubber powder according to any one of the preceding claims, wherein said process is carried out in batch or continuously, preferably continuously.

14. A vulcanizable elastomeric composition comprising at least one styrene-butadiene rubber comprising micronized recycled rubber powder obtained according to any one of the preceding claims, at least one filler selected from carbon black, silica, or mixtures thereof, and at least one vulcanizing agent.

15. A vulcanized product obtained from the vulcanization of the elastomeric composition according to claim 14.