

CLAIMS

What is claimed is:

1. A binder composition comprising a water-compatible copolymer, wherein the binder composition has a liquid content of less than 85% by weight, based on the total weight of the binder composition.

2. The binder composition according to claim 1, wherein the binder composition has a liquid content of less than 50% or less than 25% by weight, based on the total weight of the binder composition.

3. The binder composition according to claim 1, wherein the binder composition has a liquid content of less than 1% by weight, based on the total weight of the binder composition.

4. The binder composition according to claim 1, wherein the water-compatible copolymer comprises a structural unit (a) that is derived from an acid group-containing monomer, wherein the acid group is selected from the group consisting of carboxylic acid, sulfonic acid, sulfuric acid, phosphonic acid, phosphoric acid, nitric acid, salts of these acids, derivatives of these acids, and combinations thereof, and wherein the proportion of structural unit (a) within the copolymer is from about 5% to about 95% by mole, based on the total number of moles of monomeric units in the copolymer.

5. The binder composition according to claim 1, wherein the water-compatible copolymer further comprises a structural unit (b) that is derived from a monomer selected from the group consisting of an amide group-containing monomer, a hydroxyl group-containing monomer, and combinations thereof, and wherein the proportion of structural unit (b) within the copolymer is from about 5% to about 90% by mole, based on the total number of moles of monomeric units in the copolymer.

6. The binder composition according to claim 1 or 5, where in the water-compatible copolymer further comprises a structural unit (c) that is derived from a monomer selected from the group consisting of a nitrile group-containing monomer, an ester group-containing monomer, an ether group-containing monomer, an epoxy group-containing monomer, a carbonyl group-containing monomer, a fluorine-containing monomer, and combinations thereof, and wherein the proportion of structural unit (c) within the copolymer is from about 10% to about 95% by mole, based on the total number of moles of monomeric units in the copolymer.

7. The binder composition according to claim 1, wherein the liquid content is derived from an aqueous solvent.
8. The binder composition according to claim 7, wherein the aqueous solvent comprises water.
9. The binder composition according to claim 1, wherein the weight-average molecular weight of the water-compatible copolymer in the binder composition is from about 10,000 g/mol to about 1,000,000 g/mol.
10. The binder composition according to claim 1, wherein the number-average molecular weight of the water-compatible copolymer in the binder composition is from about 10,000 g/mol to about 500,000 g/mol.
11. The binder composition according to claim 1, wherein the polydispersity index of the water-compatible copolymer in the binder composition is from about 1 to about 20.
12. An electrode slurry comprising the binder composition of claim 1 and an electrode active material, wherein the electrode slurry has a liquid content of from about 1% to about 60% by weight, based on the total weight of the electrode slurry.
13. The electrode slurry according to claim 12, wherein the electrode slurry further comprises a conductive agent.
14. The electrode slurry according to claim 12, wherein the liquid content of the electrode slurry is derived from an aqueous solvent.
15. The electrode slurry according to claim 14, wherein the aqueous solvent comprises water.
16. The electrode slurry according to claim 12, wherein the proportion of electrode active material in the solid portion of the electrode slurry is from about 40% to about 99% by weight, based on the total weight of the solid portion of the electrode slurry.
17. A dry electrode mixture comprising the binder composition of claim 3 and an electrode active material.
18. The dry electrode mixture according to claim 17, wherein the dry electrode mixture further comprises a conductive agent.

19. The dry electrode mixture according to claim 17, wherein the proportion of electrode active material in the dry electrode mixture is from about 40% to about 99% by weight, based on the total weight of the dry electrode mixture.

20. The dry electrode mixture according to claim 17, wherein the dry electrode mixture has a liquid content of less than 1% by weight, based on the total weight of the dry electrode mixture.