WHAT IS CLAIMED IS:

1. A method for preparing a polymeric matrix, comprising:

combining into a damp, non-agglomerating mixture vulcanized rubber particles, a waterborne auxiliary polymer comprising a reactive moiety, and an aqueous mixture of 10-30 wt. % copper acetate, wherein 1 part by weight of the waterborne auxiliary polymer is present for every 0.01 to 100 parts by weight of the aqueous mixture, and wherein 20 parts by weight of the aqueous mixture and waterborne auxiliary polymer combined are present for every 1 to 160 parts by weight of the vulcanized rubber particles; and

applying compression and shearing action to the damp, non-agglomerating mixture, whereby a monolithic rubber macrostructure is obtained.

2. The method of Claim 1, wherein the auxiliary polymer is a polybutadiene and wherein the reactive moiety is an epoxide group.

3. The method of Claim 1, wherein the reactive moiety is selected from the group consisting of an epoxide group and a urethane group.

4. The method of Claim 1, wherein the reactive moiety is an acetate group.

5. The method of Claim 1, wherein the auxiliary polymer is an elastomer.

6. The method of Claim 5, wherein the elastomer is selected from the group consisting of butadiene, natural rubber, styrene butadiene rubber, isobutylene-isoprene rubber, styrene-1,4-cis polybutadiene polymer, trans-1,4-polyisoprene, cis-1,4-polyisoprene, natural polyisoprene, synthetic polyisoprene, chloroprene rubber, halogenated butyl rubber, nonhalogenated butyl rubber, silicone rubber, hydrogenated nitrile rubber, nonhydrogenated nitrile rubber, and 1,2-high vinyl butadiene.

7. The method of any of Claims 1-6, wherein the aqueous mixture is of 15-20 wt. % copper acetate, preferably 20 wt.% copper acetate.

8. The method of any of Claims 1-7, wherein wherein 1 part by weight of the waterborne auxiliary polymer is present for every 0.01 parts by weight of the aqueous mixture.

9. The method of any of Claims 1-8, wherein 20 parts by weight of the aqueous mixture and waterborne auxiliary polymer combined are present for every 80 parts by weight of the vulcanized rubber particles.

10. The method of any of Claims 1-9, wherein the aqueous mixture and waterborne auxiliary polymer combined has a solids residue range of 27 – 75 wt. %.

11. A monolithic rubber macrostructure as prepared by the method of any one of Claims 1-10.

12. The monolithic rubber macrostructure of Claim 11, having an effective particle size of less than 5 microns.

13. The monolithic rubber macrostructure of any of Claims 11-12, in a form of a sheet.

14. The monolithic rubber macrostructure of Claim 13, exhibiting an anisotropy in length tensile strength to width tensile strength, wherein the anisotropy in length tensile strength to width tensile strength is at least 1.1:1.

15. The monolithic rubber macrostructure of any of Claims 11-14, in a form of laminated sheets, wherein each of the sheets has a thickness of from 10 to 70 microns, and wherein each of the sheets is oriented 30 to 45 degrees to an anisotropic grain of an adjacent sheet.

16. The monolithic rubber macrostructure of any of Claims 11-15, in a form of an article selected from the group consisting of tire tread, tire sidewall, roofing membrane, high dielectric electrical tape, tank lining, reservoir lining, trench lining, bridge underlayment, wire harness wrap, self-bonding wire harness wrap, shoe soles, rubber

boots, electrical tape, foundation waterproofing, parking garage waterproofing, hose, belt, and molding.

17. The monolithic rubber macrostructure of any of Claims 11-15, in a form of a radiation shielding material.

18. A paving material comprising the monolithic rubber macrostructure of any of Claims 11-15.

19. A suspension of the monolithic rubber macrostructure of any of Claims 11-15 in asphalt.