CLAIMS

1. An article comprising a fiber or yarn having a coating, wherein the coating comprises silk-fibroin based proteins or fragments thereof having (a) an average weight average molecular weight range of 5 kDa to 144 kDa, (b) a polydispersity from 1 to 5.0, and (c) 0.01% (w/w) to 10% (w/w) sericin.

2. The article of Claim 1, wherein the article is a fabric.

3. The article of Claim 1, wherein the silk fibroin based proteins or fragments thereof are selected from the group consisting of natural silk fibroin based proteins or fragments thereof, recombinant silk fibroin based proteins or fragments thereof, and combinations thereof.

4. The article of Claim 3, wherein the silk fibroin based proteins or fragments thereof are natural silk fibroin based proteins or fragments thereof that are selected from the group consisting of spider silk fibroin based proteins or fragments thereof, silkworm silk fibroin based proteins or fragments thereof, and combinations thereof.

5. The article of Claim 4, wherein the natural silk fibroin based proteins or fragments are silkworm silk fibroin based proteins or fragments thereof, and the silkworm silk fibroin based proteins or fragments thereof is *Bombyx mori* silk fibroin based proteins or fragments thereof.

6. The article of Claim 1, wherein the coating further comprises a polymer or copolymer.

7. The article of Claim 1, wherein the silk fibroin based proteins or protein fragments thereof have an average weight average molecular weight range selected from the group consisting of 5 to 10 kDa, 6 kDa to 16 kDa, 17 kDa to 38 kDa, 39 kDa to 80 kDa, 60 to 100 kDa, and 80 kDa to 144 kDa, wherein the silk fibroin based proteins or fragments thereof have a polydispersity between 1.5 and 3.0, and wherein the proteins or protein

fragments, prior to coating the fabric, do not spontaneously or gradually gelate and do not visibly change in color or turbidity when in a solution for at least 10 days.

8. The article of Claim 1, wherein the fiber or yarn is selected from the group consisting of natural fiber or yarn, synthetic fiber or yarn, or combinations thereof.

9. The article of Claim 8, wherein the fiber or yarn is natural fiber or yarn selected from the group consisting of cotton, alpaca fleece, alpaca wool, lama fleece, lama wool, cashmere, sheep fleece, sheep wool, and combinations thereof.

10. The article of Claim 8, wherein the fiber or yarn is synthetic fiber or yarn selected from the group consisting of polyester, nylon, polyester-polyurethane copolymer, and combinations thereof.

11. The article of Claim 2, wherein the fabric exhibits an improved property, wherein the improved property is an accumulative one-way moisture transport index selected from the group consisting of greater than 40 %, greater than 60 %, greater than 80 %, greater than 100 %, greater than 120 %, greater than 140 %, greater than 160 %, and greater than 180%.

12. The article of Claim 2, wherein the fabric exhibits an improved property, wherein the improved property is an accumulative one way transport capability increase relative to uncoated fabric selected from the group consisting of 1.2 fold, 1.5 fold, 2.0 fold, and 3.0 fold.

13. The article of Claim 2, wherein the fabric exhibits an improved property, wherein the improved property is an overall moisture management capability selected from the group consisting of greater than 0.05, greater than 0.10, greater than 0.15, greater than 0.20, greater than 0.25, greater than 0.30, greater than 0.35, greater than 0.40, greater than 0.50, greater than 0.60, greater than 0.70, and greater than 0.80.

14. The article of Claim 13, wherein the improved property is determined after a period of machine washing cycles selected from the group consisting of 5 cycles, 10 cycles, 25 cycles, and 50 cycles.

15. The article of Claim 2, wherein the fabric exhibits substantially no increase in microbial growth after a number of machine washing cycles selected from the group consisting of 5 cycles, 10 cycles, 25 cycles, and 50 cycles.

16. The article of Claim 15, wherein the microbial growth is microbial growth of a microbe selected from the group consisting of *Staphylococcus aureus*, *Klebisiella pneumoniae,* and combinations thereof.

17. The article of Claim 16, wherein the microbial growth is reduced by a percentage selected from the group consisting of 50 %, 100 %, 500 %, 1000 %, 2000 %, and 3000 % compared to an uncoated fabric.

18. The article of Claim 2, wherein the coating is applied to the fabric at the fiber level prior to forming the fabric.

19. The article of Claim 2, wherein the coating is applied to the fabric at the fabric level.

20. The article of Claim 19, wherein the fabric is bath coated.

21. The article of Claim 19, wherein the fabric is spray coated.

22. The article of Claim 19, wherein the fabric is coated with a stencil.

23. The article of Claim 19, wherein the coating is applied to at least one side of the fabric using a method selected from the group consisting of a bath coating process, a spray coating process, a stencil process, a silk-foam based process, and a roller-based process.

24. The article of Claim 1, wherein the coating has a thickness of one nanolayer.

25. The article of Claim 1, wherein the coating has a thickness selected from the group consisting of 5 nm, 10 nm, 15 nm, 20 nm, 25 nm, 50 nm, 100 nm, 200 nm, 500 nm, 1 μm, 5 μm, 10 μm, and 20 μm.

26. The article of Claim 2, wherein the coating is adsorbed on the fabric.

27. The article of Claim 2, wherein the coating is attached to the fabric through chemical, enzymatic, thermal, or irradiative cross-linking.

28. The article of Claim 19, wherein the hand of the coated fabric is improved relative to an uncoated fabric.

29. The article of Claim 28, wherein the hand of the coated fabric that is improved is selected from the group consisting of softness, crispness, dryness, silkiness, and combinations thereof.