CLAIMS

1. A flame resistant fabric formed by first yarns and a second yarns and having a fabric fiber blend, wherein the fabric has a first side and a second side opposite the first side and wherein:

i. the first yarns comprise a first yarn fiber blend comprising approximately 5-20 wt.% aramid fibers, 5-20 wt.% modacrylic fibers, 30-50 wt.% cellulosic fibers, and 30-50 wt.% FR nylon fibers;

ii. the second yarns comprise a second yarn fiber blend comprising 5-20 wt.% aramid fibers, 5-20 wt.% cellulosic fibers, 30-50 wt.% modacrylic fibers, and 30-50 wt.% FR nylon fibers;

iii. the first yarns are predominantly exposed on the first side of the fabric;

iv. the second yarns are predominantly exposed on the second side of the fabric;

v. the fabric has a char length of 6 inches or less and an afterflame of 2 seconds or less when tested pursuant to ASTM D6413 (2015); and

vi. the fabric has a fabric weight that is between 5 to 9 ounces per square yard, inclusive.

2. The flame resistant fabric of claim 1, wherein the first yarn fiber blend comprises approximately 5-15 wt.% aramid fibers, 5-15 wt.% modacrylic fibers, 35-45 wt.% cellulosic fibers, and 35-45 wt.% FR nylon fibers.

3. The flame resistant fabric of claim 1, wherein the second yarn fiber blend comprises approximately 5-15 wt.% aramid fibers, 5-15 wt.% cellulosic fibers, 35-45 wt.% modacrylic fibers, and 35-45 wt.% FR nylon fibers.

4. The flame resistant fabric of claim 1, wherein the wt.% of FR nylon fibers in the first yarn fiber blend is approximately the same as the wt.% of FR nylon fibers in the second yarn fiber blend.

5. The flame resistant fabric of claim 1, wherein the wt.% of aramid fibers in the first yarn fiber blend is approximately the same as the wt.% of aramid fibers in the second yarn fiber blend.

6. The flame resistant fabric of claim 1, wherein at least some of the cellulosic fibers in the first yarn fiber blend and the second yarn fiber blend are non-FR lyocell fibers.

7. The flame resistant fabric of claim 1, wherein at least some of the aramid fibers in the first yarn fiber blend and the second yarn fiber blend are para-aramid fibers.

8. The flame resistant fabric of claim 1, wherein at least one of the first yarn fiber blend or the second yarn fiber blend is devoid of additional fiber types.

9. The flame resistant fabric of claim 8, wherein both of the first yarn fiber blend and the second yarn fiber blend are devoid of additional fiber types.

10. The flame resistant fabric of claim 1, wherein the wt.% of FR nylon fibers in the fabric fiber blend is greater than the combined wt.% of the modacrylic fibers and the aramid fibers in the fabric fiber blend.

11. The flame resistant fabric of claim 1, wherein the fabric is a woven fabric comprising a warp direction and a fill direction, wherein the first yarns are provided only in the warp direction and the second yarns are provided only in the fill direction.

12. A garment formed with the fabric of claim 1 and having a face side and a body side, wherein the first side of the fabric is exposed on the face side of the garment and the second side of the fabric is exposed on the body side of the garment.

13. A flame resistant fabric formed by first yarns and a second yarns and having a fabric fiber blend, wherein the fabric has a first side and a second side opposite the first side and wherein:

i. the first yarns comprise a first yarn fiber blend;

ii. the second yarns comprise a second yarn fiber blend that is different from the first yarn fiber blend;

iii. the fabric fiber blend comprises cellulosic fibers, aramid fibers, modacrylic fibers, and 30-50 wt.% FR nylon fibers;

iv. the first yarns are predominantly exposed on the first side of the fabric;

v. the second yarns are predominantly exposed on the second side of the fabric;

vi. the fabric has a char length of 6 inches or less and an afterflame of 2 seconds or less when tested pursuant to ASTM D6413 (2015);

vii. the fabric has a fabric weight between 5 to 7 ounces per square yard, inclusive;

viii. the fabric has a break strength of at least 150 pounds force in a warp direction of the fabric and of at least 100 pounds force in a fill direction of the fabric;

ix. the fabric has a tear strength of at least 8 pounds force in at least one of the warp direction or fill direction of the fabric; and

x. the fabric achieves a predicted burn injury percentage of 30% or less after 4 seconds, when tested pursuant to ASTM F1930 (2018).

14. The flame resistant fabric of claim 13, wherein the fabric fiber blend comprises approximately 5-20 wt.% aramid fibers, 15-40 wt.% modacrylic fibers, and 15-40 wt.% cellulosic fibers.

15. The flame resistant fabric of claim 14, wherein the fabric fiber blend comprises approximately 5-15 wt.% aramid fibers, 15-30 wt.% modacrylic fibers, 15-30 wt.% cellulosic fibers, and 35-45 wt.% FR nylon fibers.

16. The flame resistant fabric of claim 15, wherein the fabric fiber blend comprises approximately 8-12 wt.% aramid fibers, 20-30 wt.% modacrylic fibers, and 20-30 wt.% cellulosic fibers.

17. The flame resistant fabric of claim 13, wherein the wt.% of FR nylon in the fabric fiber blend is more than the wt.% of each of the cellulosic fibers, the aramid fibers, and the modacrylic fibers in the fabric fiber blend.

18. The flame resistant fabric of claim 13, wherein the fabric has an arc rating of at least 4 cal/cm$^2$ when tested pursuant to ASTM F1959 (2014).

19. The flame resistant fabric of claim 13, wherein each of the first yarn fiber blend and the second yarn fiber blend comprises cellulosic fibers, modacrylic fibers, aramid fibers, and FR nylon fibers.

20. The flame resistant fabric of claim 13, wherein the wt.% of FR nylon fibers in the fabric fiber blend is greater than the combined wt.% of the modacrylic fibers and the aramid fibers in the fabric fiber blend.

21. A flame resistant fabric comprising a fabric fiber blend and formed of a plurality of yarns, wherein:

vii. each of the plurality of yarns is formed from a yarn fiber blend that comprises aramid fibers, modacrylic fibers, cellulosic fibers, and FR nylon fibers;

viii. the fabric fiber blend comprises 5-20 wt. % aramid fibers, 15-40 wt. % modacrylic fibers, 15-40 wt. % cellulosic fibers, and 30-50 wt. % FR nylon fibers, inclusive; and

ix. the fabric has a char length of 6 inches or less and an afterflame of 2 seconds or less when tested pursuant to ASTM D6413 (2015).

22. The flame resistant fabric of claim 21, wherein the yarn fiber blend is identical for all of the plurality of yarns, and wherein the yarn fiber blend is identical to the fabric fiber blend.

23. The flame resistant fabric of claim 21, wherein the fabric fiber blend comprises 5-15 wt. % aramid fibers, 15-30 wt. % modacrylic fibers, 15-30 wt. % cellulosic fibers, and 35-45 wt. % FR nylon fibers, inclusive.

24. The flame resistant fabric of claim 21, wherein the wt. % of FR nylon fibers in the fabric fiber blend is greater than the wt. % of each of the aramid, modacrylic, and cellulosic fibers in the fabric fiber blend.

25. The flame resistant fabric of claim 21, wherein the wt. % of FR nylon fibers in the fabric fiber blend is greater than a combined wt. % of the modacrylic fibers and the aramid fibers in the fabric fiber blend.

26. The flame resistant fabric of claim 21, wherein the fabric fiber blend consists of 5-20 wt. % aramid fibers, 15-40 wt. % modacrylic fibers, 15-40 wt. % cellulosic fibers, and 30-50 wt. % FR nylon fibers, inclusive.

27. The flame resistant fabric of claim 21, wherein the plurality of yarns comprises a first set of yarns having a first yarn fiber blend and a second set of yarns having a second yarn fiber blend different than the first yarn fiber blend.

28. The flame resistant fabric of claim 27, wherein the first yarn fiber blend comprises approximately 5-15 wt.% aramid fibers, 5-15 wt.% modacrylic fibers, 35-45 wt.% cellulosic fibers, and 35-45 wt.% FR nylon fibers, inclusive.

29. The flame resistant fabric of claim 28, wherein the second yarn fiber blend comprises approximately 5-15 wt.% aramid fibers, 35-45 wt.% modacrylic fibers, 5-15 wt.% cellulosic fibers, and 35-45 wt.% FR nylon fibers, inclusive.

30. The flame resistant fabric of claim 27, wherein the fabric is a woven fabric comprising a warp direction and a fill direction, wherein the first set of yarns is

provided only in one of the warp direction or the fill direction and the second set of yarns is provided only in the other of the warp direction or the fill direction.

31. The flame resistant fabric of claim 27, wherein the fabric is a woven fabric comprising a warp direction and a fill direction, wherein the first and second sets of yarn are both provided in at least one of the warp direction or the fill direction.

32. The flame resistant fabric of claim 21, wherein at least some of the cellulosic fibers in the fabric fiber blend are non-FR lyocell fibers.

33. The flame resistant fabric of claim 21, wherein at least some of the aramid fibers in the fabric fiber blend are para-aramid fibers.

34. The flame resistant fabric of claim 21, wherein the fabric has a weight of 3-12 ounces per square yard, inclusive.

35. A flame resistant fabric comprising a fabric fiber blend and formed of a plurality of yarns, wherein:

i. each of the plurality of yarns is formed from a yarn fiber blend that comprises aramid fibers, modacrylic fibers, cellulosic fibers, and FR nylon fibers;
ii. the fabric fiber blend comprises 5-20 wt. % aramid fibers, 15-40 wt. % modacrylic fibers, 15-40 wt. % cellulosic fibers, and 30-50 wt. % FR nylon fibers, inclusive;
iii. the wt. % of FR nylon fibers in the fabric fiber blend is greater than the wt. % of each of the aramid, modacrylic, and cellulosic fibers in the fabric fiber blend;
iv. the fabric has a char length of 6 inches or less and an afterflame of 2 seconds or less when tested pursuant to ASTM D6413 (2015);
v. the fabric has a tear strength of at least 8 pounds force in at least one of the warp direction or fill direction of the fabric; and

vi. the fabric achieves a predicted burn injury percentage of 30% or less after 4 seconds, when tested pursuant to ASTM F1930 (2018).

36. The flame resistant fabric of claim 35, wherein the yarn fiber blend is identical for all of the plurality of yarns, and wherein the yarn fiber blend is identical to the fabric fiber blend.

37. The flame resistant fabric of claim 35, wherein the fabric fiber blend comprises 5-15 wt. % aramid fibers, 15-30 wt. % modacrylic fibers, 15-30 wt. % cellulosic fibers, and 35-45 wt. % FR nylon fibers, inclusive.

38. The flame resistant fabric of claim 35, wherein the wt. % of FR nylon fibers in the fabric fiber blend is greater than a combined wt. % of the modacrylic fibers and the aramid fibers in the fabric fiber blend.

39. The flame resistant fabric of claim 35, wherein the fabric fiber blend consists of 5-20 wt. % aramid fibers, 15-40 wt. % modacrylic fibers, 15-40 wt. % cellulosic fibers, and 30-50 wt. % FR nylon fibers, inclusive.

40. The flame resistant fabric of claim 35, wherein the fabric has a break strength of at least 150 pounds force in a warp direction of the fabric and of at least 100 pounds force in a fill direction of the fabric