What is claimed is:

1. A high wear-resistant nylon composite material for rollers on an airport freight vehicle comprising:

60-80 wt% of nylon 6;

5-13 wt% of glass beads;

6-14 wt% of glass fiber powder;

5-7 wt% of lubricating anti-wear agent;

3-5 wt% of graft type toughening modifying agent;

0.3-1 wt% of antioxidant;

0.2-0.3 wt% of lubricating dispersant; and

0.2-0.5 wt% of nucleating agent.

2. A high wear-resistant nylon composite material for rollers on an airport freight vehicle comprising:

60-80 wt% of nylon 66;

5-13 wt% of glass beads;

6-14 wt% of glass fiber powder;

5-7 wt% of lubricating anti-wear agent;

3-5 wt% of graft type toughening modifying agent;

0.3-1 wt% of antioxidant;

0.2-0.3 wt% of lubricating dispersant; and

0.2-0.5 wt% of nucleating agent.

3. A high wear-resistant nylon composite material for rollers on an airport freight vehicle comprising:

18-41 wt% of nylon 6;

28-42 wt% of nylon 66;

5-13 wt% of glass beads;

6-14 wt% of glass fiber powder;

5-7 wt% of lubricating anti-wear agent;

3-5 wt% of graft type toughening modifying agent;

0.3-1 wt% of antioxidant;

0.2-0.3 wt% of lubricating dispersant; and

0.2-0.5 wt% of nucleating agent.

4. A high wear-resistant nylon composite material for rollers on an airport freight vehicle comprising:

60-80 wt% of nylon 6, or nylon 66, or a mixture of nylon 6 and nylon 66;

5-16 wt% of glass beads;

6-18 wt% of glass fiber powder;

5-7 wt% of lubricating anti-wear agent.

5. The high wear-resistant nylon composite material as claimed in any one of claims 1-4, wherein the lubricating anti-wear agent is selected from the group consisting of ultra-high

molecular weight polyethylene, PTFE (Polytetrafluoroethylene), and any combination thereof.

6. The high wear-resistant nylon composite material as claimed in any one of claims 1-4, wherein the surfaces of the glass beads and the glass fiber powder are treated by a silane coupling agent.

7. The high wear-resistant nylon composite material as claimed in claim 4, further comprising graft type toughening modifying agent.

8. The high wear-resistant nylon composite material as claimed in claim 7, wherein the graft type toughening modifying agent is present in an amount of 3-5 wt%.

9. The high wear-resistant nylon composite material as claimed in claim 1, or 2, or 3, or 7, or 8 wherein the graft type toughening modifying agent is graft polymerization oligomer with polyolefin elastomer (POE) grafted unsaturated acid or acid anhydride, and the melt index of the graft type toughening modifying agent is 1.0-5.0g/10min and the graft rate of the graft type toughening modifying agent is 0.5-1%.

10. The high wear-resistant nylon composite material as claimed in claim 9, wherein the graft polymerization oligomer with polyolefin elastomer (POE) grafted unsaturated acid or acid anhydride is maleic anhydride grafted polyolefin elastomer (POE) with a melt index of 2g/10min and a graft rate of 0.8%.

11. The high wear-resistant nylon composite material as claimed in claim 4, further comprising antioxidant.

12. The high wear-resistant nylon composite material as claimed in claim 11, wherein the antioxidant is present in an amount of 0.3-1 wt%.

13. The high wear-resistant nylon composite material as claimed in claim 1, or 2, or 3, or 11, or 12 wherein the antioxidant is a mixed system with hindered phenolic antioxidant and phosphite ester antioxidant.

14. The high wear-resistant nylon composite material as claimed in claim 13, wherein the mixed system with hindered phenolic antioxidant and phosphite ester antioxidant is antioxidant 1098 and antioxidant 168 having a weight ratio of 1:1.

15. The high wear-resistant nylon composite material as claimed in claim 4, further comprising lubricating dispersant.

16. The high wear-resistant nylon composite material as claimed in claim 15, wherein the lubricating dispersant is present in an amount of 0.2-0.3 wt%.

17. The high wear-resistant nylon composite material as claimed in claim 1, or 2, or 3, or 15, or 16, wherein the lubricating dispersant is stearate.

18. The high wear-resistant nylon composite material as claimed in claim 17, wherein the stearate is selected from the group consisting of calcium stearate, zinc stearate, aluminum stearate and any combination thereof.

19. The high wear-resistant nylon composite material as claimed in claim 4, further comprising nucleating agent.

20. The high wear-resistant nylon composite material as claimed in claim 19, wherein the nucleating agent is present in an amount of 0.2-0.5 wt%.

21. The high wear-resistant nylon composite material as claimed in claim 1, or 2, or 3, or 19, or 20, wherein the nucleating agent is a commercially available nucleating agent P-20.

22. The high wear-resistant nylon composite material as claimed in claim 4, wherein the weight percentages of the components are:

69-73 wt% of nylon 6, or nylon 66, or a mixture of nylon 6 and nylon 66;

5-12 wt% of glass beads;

10-17 wt% of glass fiber powder;

5-6 wt% of lubricating anti-wear agent.

23. A preparation method of the high wear-resistant nylon composite material as claimed in claim 1, wherein the method comprising the following steps:

weighing up the following ingredients according to the following weight percentages, 60-80 wt% of the nylon 6, 5-13 wt% of the glass beads, 6-14 wt% of the glass fiber powder, 5-7 wt% of the lubricating anti-wear agent, 3-5 wt% of the graft type toughening modifying agent, 0.3-1 wt% of the antioxidant, 0.2-0.3 wt% of the lubricating dispersant and 0.2-0.5 wt% of the nucleating agent; and

placing the above ingredients in a high speed mixing machine to mix the ingredients and form a uniform mixture, transferring the mixture to an extruder to extrude and granulate the mixture at a processing temperature of 210-290℃.

24. A preparation method of the high wear-resistant nylon composite material as claimed in claim 2, wherein the method comprising the following steps:

weighing up the following ingredients according to the following weight percentages, 60-80 wt% of the nylon 66, 5-13 wt% of the glass beads, 6-14 wt% of the glass fiber powder, 5-7 wt% of the lubricating anti-wear agent, 3-5 wt% of the graft type toughening modifying agent, 0.3-1 wt% of the antioxidant, 0.2-0.3 wt% of the lubricating dispersant and 0.2-0.5 wt% of the nucleating agent; and

placing the above ingredients in a high speed mixing machine to mix the ingredients and form a uniform mixture, transferring the mixture to an extruder to extrude and granulate the mixture at a processing temperature of 210-290℃.

25. A preparation method of the high wear-resistant nylon composite material as claimed in claim 3, wherein the method comprising the following steps:

weighing up the following ingredients according to the following weight percentages, 18-41 wt% of the nylon 6, 28-42 wt% of the nylon 66, 5-13 wt% of the glass beads, 6-14 wt% of the glass fiber powder, 5-7 wt% of the lubricating anti-wear agent, 3-5 wt% of the graft type toughening modifying agent, 0.3-1 wt% of the antioxidant, 0.2-0.3 wt% of the lubricating dispersant and 0.2-0.5 wt% of the nucleating agent; and

placing the above ingredients in a high speed mixing machine to mix the ingredients and form a uniform mixture, transferring the mixture to an extruder to extrude and granulate the mixture at a processing temperature of 210-290℃.

26. A preparation method of the high wear-resistant nylon composite material as claimed in claim 4, wherein the method comprising the following steps:

weighing up the following ingredients according to the following weight percentages, 60-80 wt% of the nylon 6 or the nylon 66 or the mixture of the nylon 6 and the nylon 66, 5-16 wt% of the glass beads, 6-18 wt% of the glass fiber powder, 5-7 wt% of the lubricating anti-wear agent; and

placing the above ingredients in a high speed mixing machine to mix the ingredients and form a uniform mixture, transferring the mixture to an extruder to extrude and granulate the mixture at a processing temperature of 210-290℃.

Claims

1. A high wear-resistant nylon composite material for rollers on an airport freight vehicle comprising:

5-16 wt% of glass beads;

6-18 wt% of glass fiber powder;

5-7 wt% of lubricating anti-wear agent;

18-41 wt% of nylon 6;

28-42 wt% of nylon 66;

3-5 wt% of graft toughening modifying agent;

0.3-1 wt% of antioxidant;

0.2-0.3 wt% of lubricating dispersant; and

0.2-0.5 wt% of nucleating agent.

2. The high wear-resistant nylon composite material as claimed in claim 1, wherein the lubricating anti-wear agent is selected from the group consisting of ultra-high molecular weight polyethylene, PTFE (Polytetrafluoroethylene), and any combination thereof.

3. The high wear-resistant nylon composite material as claimed in claim 1, wherein the surfaces of the glass beads and the glass fiber powder are treated by a silane coupling agent.

4. The high wear-resistant nylon composite material as claimed in claim 1, wherein the graft toughening modifying agent is graft polymerization oligomer with polyolefin elastomer (POE) grafted unsaturated acid or acid anhydride, and the melt index of the graft toughening modifying agent is 1.0-5.0g/10min and the graft rate of the graft toughening modifying agent is 0.5-1%.

5. The high wear-resistant nylon composite material as claimed in claim 4, wherein the graft polymerization oligomer with polyolefin elastomer (POE) grafted unsaturated acid or acid anhydride is maleic anhydride grafted polyolefin elastomer (POE) with a melt index of 2g/10min and a graft rate of 0.8%.

6. The high wear-resistant nylon composite material as claimed in claim 1 wherein the antioxidant is a mixed system with hindered phenolic antioxidant and phosphite ester antioxidant.

7. The high wear-resistant nylon composite material as claimed in claim 6, wherein the mixed system with hindered phenolic antioxidant and phosphite ester antioxidant is N,N'-1,6-sub-hexyl-II-[3,5-di-tert-butyl-4-hydroxyphenyl propionamide] and tri (2,4-ditertrabutyl phenyl) phosphite ester having a weight ratio of 1:1.

8. The high wear-resistant nylon composite material as claimed in claim 1, wherein the lubricating dispersant is stearate.

9. The high wear-resistant nylon composite material as claimed in claim 8, wherein the stearate is selected from the group consisting of calcium stearate, zinc stearate, aluminum stearate and any combination thereof.

10. The high wear-resistant nylon composite material as claimed in claim 1, wherein the nucleating agent is a calcium carboxylates with a long carbon chain as a main component.

11. A preparation method of the high wear-resistant nylon composite material as claimed in claim 1, wherein the method comprising the following steps:

weighing up the following ingredients according to the following weight percentages, 18-41 wt% of nylon 6; 28-42 wt% of nylon 66; 5-16 wt% of glass beads; 6-18 wt% of glass fiber powder; 5-7 wt% of lubricating anti-wear agent; 3-5 wt% of graft toughening modifying agent; 0.3-1 wt% of antioxidant; 0.2-0.3 wt% of lubricating dispersant; and 0.2-0.5 wt% of nucleating agent; and

placing the above ingredients in a high speed mixing machine to mix the ingredients and form a uniform mixture, transferring the mixture to an extruder to extrude and granulate the mixture at a processing temperature of 210-290℃.