SUMMARY OF THE INVENGTION

Problem to be Solved by the Invention

The manufacturing method disclosed in patent document 1 yields metal staple fibers contained within pellets; however, it is difficult to remove only the metal staple fibers from the pellets, and the applications for which the fibers can be used in pellet form are limited. Meanwhile, the manufacturing method disclosed in document 2 requires a cooling device for freezing the water-impregnated metal fiber bundle, leading to the problem of increased manufacturing costs.

Embodiments of the present invention seek to provide a method for manufacturing metal staple fibers that may allow for the efficient manufacture of uniformly cut metal staple fibers by suppressing bundle collapse when cutting metal fiber bundles. Embodiments of the present invention also seek to provide an apparatus for manufacturing metal staple fibers that may allow for the efficient manufacture of uniformly cut metal staple fibers.

MEANS FOR SOLVING THE PROBLEM

One aspect of the present invention relates to a method for manufacturing metal staple fibers. This manufacturing method includes a cutting step of cutting a metal fiber bundle coated with a fluorine-based polymer into a staple fiber bundle. The method further includes a removal step of using a fluorine-based solvent to dissolve and remove at least some of the fluorine-based polymer coating the staple fiber bundle.

In one embodiment, the fluorine atom content of the fluorine-based polymer may be at least 40% by mass of the total mass of the fluorine-based polymer.

In one embodiment, the manufacturing method may further include a coating step of impregnating a metal fiber bundle with a coating fluid containing the fluorine-based polymer, and coating the metal fiber bundle with the fluorine-based polymer.

In one embodiment, some or all of the fluorine-based polymer removed in the removal step can be reused to coat metal fiber bundles in the manufacturing method.

Another aspect of the present invention relates to an apparatus for manufacturing metal staple fibers. The manufacturing apparatus is provided with a coating mechanism for coating a metal fiber bundle with a fluorine-based polymer, and a cutting mechanism

for cutting the metal fiber bundle coated with the fluorine-based polymer into staple fiber bundles.

In one embodiment, the coating mechanism may include a coating tank for storing a coating fluid containing the fluorine-based polymer, and a conveying means for passing the metal fiber bundle through the coating tank so that the coating fluid impregnates the metal fiber bundle.

In one embodiment, the manufacturing apparatus may be further provided with a removal mechanism for using a fluorine -based solvent to dissolve and remove at least some of the fluorine-based polymer coating the staple fiber bundle.

In one embodiment, the removal mechanism may immerse the staple fiber bundle in the fluorine-based solvent to dissolve at least some of the fluorine-based polymer.

In one embodiment, the manufacturing apparatus may be further provided with a recovery mechanism for recovering the fluorine-based polymer removed by the removal mechanism.

EFFECT OF THE INVENTION

In accordance with embodiments of the present invention, it is possible to provide a method for manufacturing metal staple fibers that allows for the efficient manufacture of uniformly cut metal staple fibers by suppressing bundle collapse when cutting metal fiber bundles. In accordance with embodiments of the present invention, it is also possible to provide an apparatus for manufacturing metal staple fibers that allows for the efficient manufacture of uniformly cut metal staple fibers.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a schematic illustration of an embodiment of an apparatus for manufacturing metal staple fibers according to the present invention.

BEST MODE FOR CARRYING OUT THE INVENTION

A preferred embodiment of the present invention will be described below. (Method for Manufacturing Metal Staple Fibers)

What is claimed is:

1. A method for manufacturing metal staple fibers, the method thereof comprising a cutting step of cutting a metal fiber bundle coated with a fluorine-based polymer into a staple fiber bundle, further including a removal step of using a fluorine-based solvent to dissolve and remove at least some of the fluorine-based polymer coating the staple fiber bundle.

2. The manufacturing method according to claim 1, wherein the fluorine-based polymer has a fluorine atom content of at least 40% by mass with respect to the total mass of the fluorine-based polymer.

3. The manufacturing method according to claim 1, further including a coating step of impregnating a metal fiber bundle with a coating fluid containing the fluorine-based polymer to coat the metal fiber bundle in the fluorine-based polymer.

4. The manufacturing method according to claim 1, wherein some or all of the fluorine-based polymer removed in the removal step is reused to coat the metal fiber bundle.

5. An apparatus for manufacturing metal staple fibers provided with:

a coating mechanism for coating a metal fiber bundle with a fluorine-based polymer; and

a cutting mechanism for cutting the metal fiber bundle coated with the fluorine-based polymer into staple fiber bundles.

6. The manufacturing apparatus according to claim 5, wherein the coating mechanism comprises:

a coating tank for storing a coating fluid containing the fluorine-based polymer; and

a conveying means for passing the metal fiber bundle through the coating tank so that the metal fiber bundle is impregnated with the coating fluid.

7. The manufacturing apparatus according to claim 5, further provided with a removal mechanism that uses a fluorine-based solvent to dissolve and remove at least some of the fluorine-based polymer coating the staple fiber bundle.

8. The manufacturing apparatus according to claim 7, wherein the removal mechanism dissolves at least some of the fluorine-based polymer by immersing the staple fiber bundle in the fluorine-based solvent.

9. The manufacturing apparatus according to claim 7, further provided with a recovery mechanism for recovering the fluorine-based polymer removed by the removal mechanism.