Claims

[Claim 1]

A method for manufacturing an additively manufactured body comprising:

an additive manufacturing step of shaping the additively manufactured body in a heating state, the additively manufactured body being formed of a difficult-to-cut material; and

a machining step of machining the additively manufactured body in a state in which the heating state is maintained,

wherein the difficult-to-cut material is a cemented carbide, a cermet, or a Ti alloy, and

wherein in the additive manufacturing step, the additively manufactured body is shaped by melting a raw material powder of the difficult-to-cut material which is discharged to a region to be irradiated with a heat source, and solidifying the melt.

[Claim 2]

The method for manufacturing the additively manufactured body according to claim 1,

wherein the additive manufacturing step and the machining step are repeated a plurality of times, and the heating state is maintained in the additive manufacturing step and the machining step which are repeated a plurality of times.

[Claim 3]

The method for manufacturing the additively manufactured body according to claim 1 or claim 2, further comprising:

a preheating step of heating a substrate on which the additively manufactured body is to be shaped, until the

substrate becomes the heated state, prior to the additive manufacturing step.

[Claim 4]
The method for manufacturing the additively manufactured body according to any one of claim 1 to claim 3,
wherein the heating state is realized by one or both of high-frequency induction heating and a semiconductor laser.

[Claim 5]
The method for manufacturing the additively manufactured body according to any one of claim 1 to claim 4,
wherein in the additive manufacturing step, the raw material powder is supplied continuously or intermittently.

[Claim 6]
The method for manufacturing the additively manufactured body according to any one of claim 1 to claim 5, wherein
when Mp (°C) is defined as a melting point of the material constituting the additively manufactured body, the heated state has a temperature of 1/6 Mp or higher and 5/6 Mp or lower.

[Claim 7]
The method for manufacturing the additively manufactured body according to any one of claim 1 to claim 6,
wherein the machining step comprises machining with a ceramic tool.

[Claim 8]

The method for manufacturing the additively manufactured body according to any one of claim 1 to claim 7,

wherein the heat source is any one of laser, an electron beam, plasma and an arc.

[Claim 9]

An apparatus for manufacturing an additively manufactured body comprising:

a shaping unit for shaping the additively manufactured body, wherein the additively manufactured body is formed of a difficult-to-cut material which is a cemented carbide, a cermet, or a Ti alloy;

a machining unit for machining the additively manufactured body;

a heating unit for heating the additively manufactured body, at least in a process of shaping the additively manufactured body by the shaping unit and in a process of the machining by the machining unit; and

a control unit for controlling operations of the machining unit and the heating unit;

wherein the shaping unit is configured to perform an additive manufacturing in such a manner that the additively manufactured body is shaped by melting a raw material powder of the difficult-to-cut material which is discharged to a region to be irradiated with a heat source, and solidifying the melt, the heat source being any one of laser, an electron beam, plasma and an arc, and

wherein the control unit is configured to control operations of the machining unit and the heating unit such that the whole process of machining the additively manufactured body by the machining unit is performed in a state in which the heating state is maintained.

[Claim 10]

The apparatus for manufacturing the additively manufactured body according to claim 9,

wherein the heating unit heats the additively manufactured body by one or both of high-frequency induction heating and a semiconductor laser.

[Claim 11]

The apparatus for manufacturing the additively manufactured body according to claim 9 or claim 10,

wherein the machining unit machines the additively manufactured body with use of a ceramic tool.