CLAIMS

1. An FePt-based sputtering target comprising Fe, Pt, a metal oxide, and further comprising one or more kinds of metal elements other than Fe and Pt,

wherein the FePt-based sputtering target has a structure in which an FePt-based alloy phase and a metal oxide phase containing unavoidable impurities are mutually dispersed, the FePt-based alloy phase containing Pt in an amount of 40 at% or more and less than 60 at% and the one or more kinds of metal elements other than Fe and Pt in an amount of more than 0 at% and 20 at% or less with the balance being Fe and unavoidable impurities and with a total amount of Pt and the one or more kinds of metal elements being 60 at% or less, ~~and~~

wherein the metal oxide is contained in an amount of 20 vol% or more and 40 vol% or less based on a total amount of the target, and

wherein the metal oxide phase has an average size of 0.4 μm or less as determined by an intercept method.

2. An FePt-based sputtering target comprising Fe, Pt, C, a metal oxide, and further comprising one or more kinds of metal elements other than Fe and Pt,

wherein the FePt-based sputtering target has a structure in which an FePt-based alloy phase, a C phase containing unavoidable impurities, and a metal oxide phase containing unavoidable impurities are mutually dispersed, the FePt-based

alloy phase containing Pt in an amount of 40 at% or more and less than 60 at% and the one or more kinds of metal elements other than Fe and Pt in an amount of more than 0 at% and 20 at% or less with the balance being Fe and unavoidable impurities and with a total amount of Pt and the one or more kinds of metal elements being 60 at% or less, ~~and~~

wherein C is contained in an amount of more than 0 vol% and 20 vol% or less based on a total amount of the target, the metal oxide is contained in an amount of 10 vol% or more and less than 40 vol% based on the total amount of the target, and a total content of C and the metal oxide is 20 vol% or more and 40 vol% or less based on the total amount of the target, and

wherein a phase consisting of the C phase and the metal oxide phase has an average size of 0.4 μm or less as determined by an intercept method.

~~3. The FePt-based sputtering target according to claim 1,~~

~~wherein the metal oxide phase has an average size of 0.4 μm or less as determined by an intercept method.~~

~~4. The FePt-based sputtering target according to claim 2,~~

~~wherein the phase consisting of the C phase and the metal oxide phase has an average size of 0.4 μm or less as determined by an intercept method.~~

~~5~~3. The FePt-based sputtering target according to ~~any~~

~~one of claims 1 to 4~~ claim 1 or 2,

wherein the one or more kinds of metal elements other than Fe and Pt are one or more kinds of Cu, Ag, Mn, Ni, Co, Pd, Cr, V, and B.

~~6~~4. The FePt-based sputtering target according to ~~any one of claims 1 to 4~~ claim 1 or 2,

wherein the one or more kinds of metal elements other than Fe and Pt include Cu.

~~7~~5. The FePt-based sputtering target according to ~~any one of claims 1 to 4~~ claim 1 or 2,

wherein the one or more kinds of metal elements other than Fe and Pt are only Cu.

~~8~~6. The FePt-based sputtering target according to any one of ~~claims 1 to 7~~ claims 1 to 5,

wherein the metal oxide contains at least one of SiO_2, TiO_2, Ti_2O_3, Ta_2O_5, Cr_2O_3, CoO, Co_3O_4, B_2O_3, Fe_2O_3, CuO, Cu_2O, Y_2O_3, MgO, Al_2O_3, ZrO_2, Nb_2O_5, MoO_3, CeO_2, Sm_2O_3, Gd_2O_3, WO_2, WO_3, HfO_2, and NiO_2.

~~9~~7. The FePt-based sputtering target according to any one of ~~claims 1 to 8~~ claims 1 to 6,

wherein the FePt-based sputtering target has a relative

density of 90% or higher.

~~10~~8. The FePt-based sputtering target according to any one of ~~claims 1 to 9~~ claims 1 to 7,

wherein the FePt-based sputtering target is used for a magnetic recording medium.

~~11~~9. A process for producing an FePt-based sputtering target, comprising:

adding metal oxide powder containing unavoidable impurities to FePt-based alloy powder containing Pt in an amount of 40 at% or more and less than 60 at% and the one or more kinds of metal elements other than Fe and Pt in an amount of more than 0 at% and 20 at% or less with the balance being Fe and unavoidable impurities and with a total amount of Pt and the one or more kinds of metal elements being 60 at% or less so that the metal oxide powder accounts for 20 vol% or more and 40 vol% or less of a total amount of the FePt-based alloy powder and the metal oxide powder, followed by mixing the FePt-based alloy powder and the metal oxide powder to produce a powder mixture; and

molding the produced powder mixture while the powder mixture is heated under pressure.

~~12~~10. A process for producing an FePt-based sputtering

target, comprising:

adding C powder containing unavoidable impurities and metal oxide powder containing unavoidable impurities to FePt-based alloy powder containing Pt in an amount of 40 at% or more and less than 60 at% and the one or more kinds of metal elements other than Fe and Pt in an amount of more than 0 at% and 20 at% or less with the balance being Fe and unavoidable impurities and with a total amount of Pt and the one or more kinds of metal elements being 60 at% or less so that the C powder and the metal oxide powder are added to satisfy:

$0 < \alpha \leq 20$;

$10 \leq \beta < 40$; and

$20 \leq \alpha + \beta \leq 40$,

where α and β represent contents of the C powder and the metal oxide powder by vol%, respectively, based on a total amount of the FePt-based alloy powder, the C powder, and the metal oxide powder, followed by mixing the FePt-based alloy powder, the C powder, and the metal oxide powder to produce a powder mixture; and

molding the produced powder mixture while the powder mixture is heated under pressure.

~~13~~11. The process for producing an FePt-based sputtering target according to claim ~~11~~9,

wherein a metal oxide phase in the obtained FePt-based

sputtering target has an average phase size of 0.4 μm or less as determined by an intercept method.

~~14~~12. The process for producing an FePt-based sputtering target according to claim ~~12~~10,

wherein a phase consisting of the C phase and the metal oxide phase in the obtained FePt-based sputtering target has an average size of 0.4 μm or less as determined by an intercept method.

~~15~~13. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~9 to ~~14~~12,

wherein the one or more kinds of metal elements other than Fe and Pt are one or more kinds of Cu, Ag, Mn, Ni, Co, Pd, Cr, V, and B.

~~16~~14. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~9 to ~~14~~12,

wherein the one or more kinds of metal elements other than Fe and Pt include Cu.

~~17~~15. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~9 to ~~14~~12,

wherein the one or more kinds of metal elements other than Fe and Pt are only Cu.

~~18~~16. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~ 9 to ~~17~~15,

wherein the metal oxide contains at least one of SiO_2, TiO_2, Ti_2O_3, Ta_2O_5, Cr_2O_3, CoO, Co_3O_4, B_2O_3, Fe_2O_3, CuO, Cu_2O, Y_2O_3, MgO, Al_2O_3, ZrO_2, Nb_2O_5, MoO_3, CeO_2, Sm_2O_3, Gd_2O_3, WO_2, WO_3, HfO_2, and NiO_2.

~~19~~17. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~ 9 to ~~18~~16,

wherein the mixing to produce the powder mixture is performed in an atmosphere in the presence of oxygen.

~~20~~18. The process for producing an FePt-based sputtering target according to claim ~~19~~17,

wherein oxygen is supplied to the atmosphere from outside of the atmosphere.

~~21~~19. The process for producing an FePt-based sputtering target according to claim ~~20~~18,

wherein the oxygen is supplied by supplying air.

~~22~~20. The process for producing an FePt-based sputtering target according to any one of claims ~~19~~17 to ~~21~~19,

wherein the atmosphere is air.

~~23~~21. The process for producing an FePt-based sputtering target according to claim ~~19~~17 or ~~20~~18,

wherein the atmosphere is composed substantially of an inert gas and oxygen.

~~24~~22. The process for producing an FePt-based sputtering target according to any one of claims ~~19~~17 to ~~23~~21,

wherein a concentration of oxygen in the atmosphere is 10 vol% or higher and 30 vol% or lower.

~~25~~23. The process for producing an FePt-based sputtering target according to any one of claims ~~19~~17 to ~~24~~22,

wherein the atmosphere is released to air during the mixing.

~~26~~24. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~9 to ~~25~~23,

wherein an atmosphere when the powder mixture is molded while heated under pressure is a vacuum or an inert gas atmosphere.

~~27~~25. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~9 to ~~26~~24,

wherein the FePt-based alloy powder is produced by an

atomizing method.

~~28~~26. The process for producing an FePt-based sputtering target according to claim ~~27~~25,

wherein the atomizing method is performed using argon gas or nitrogen gas.

~~29~~27. The process for producing an FePt-based sputtering target according to any one of claims ~~11~~ 9 to ~~28~~26,

wherein the obtained FePt-based sputtering target is used for a magnetic recording medium.

~~30. An FePt-based sputtering target produced by the process for producing according to any one of claims 11 to 29.~~