

ABSTRACT

The present invention provides a perpendicular magnetic recording medium including at least a nonmagnetic substrate and a magnetic recording layer. The magnetic recording layer is constituted by a plurality of layers including at least a first magnetic recording layer and a second magnetic recording layer. The first magnetic recording layer has a granular structure including first magnetic crystal grains and a first nonmagnetic crystal grain boundary surrounding the first magnetic crystal grains, the first magnetic crystal grains including an ordered alloy, and the first nonmagnetic crystal grain boundary being constituted by carbon. The second magnetic recording layer has a granular structure including second magnetic crystal grains and a second nonmagnetic crystal grain boundary surrounding the second magnetic crystal grains, the second magnetic crystal grains including an ordered alloy, and the second nonmagnetic crystal grain boundary being constituted by a carbon-containing nonmagnetic material.

FIG. 5

MAGNETIC ANISOTROPY K_u (erg/cm³)

TOTAL THICKNESS OF MAGNETIC LAYERS (nm)

FIG. 6

MAGNETIC ANISOTROPY K_u (erg/cm³)

TOTAL THICKNESS OF MAGNETIC RECORDING LAYERS (nm)

FIG. 7

COMPARATIVE EXAMPLE

EXAMPLE

FIG. 8

COMPARATIVE EXAMPLE

EXAMPLE

FIG. 9

AMOUNT ADDED TO SECOND LAYER: B + C vol%

FIG. 10A

PLANAR TEM IMAGE OF EXAMPLE 10

FIG. 10B

PLANAR TEM IMAGE OF COMPARATIVE EXAMPLE 9

FIG. 11

EXAMPLE

TOTAL THICKNESS [nm]

FIG. 12A

CROSS-SECTIONAL TEM IMAGE, EXAMPLE 20, FePt-B₄C/FePt-C, REPEATED
STACKING <TOTAL THICKNESS 10 nm>

GRAIN GROWTH IS NOT RESET UNTIL THICKNESS OF 10 nm

FePt-B₄C/FePt-C (MULTILAYER CONFIGURATION)

MgO LAYER

FIG. 12B

CROSS-SECTIONAL TEM IMAGE, EXAMPLE 3, FePt-B₄C (7 nm)/FePt-C (2
nm), 2 LAYERS <TOTAL THICKNESS 9 nm>

GRAIN GROWTH IS RESET AT THICKNESS OF ABOUT 7 nm

FePt-B₄C/FePt-C (TWO-LAYER CONFIGURATION)

MgO LAYER