

Claims

WHAT IS CLAIMED IS:

1. A magnetic recording stack comprising:

a substrate;

5 one or more magnetic granular recording layers disposed over the substrate, each of the one or more magnetic granular recording layers having a lateral exchange coupling;

a first continuous layer having an intermediate lateral exchange coupling higher than the lateral exchange coupling of the one or more magnetic granular recording layers; and

10 a second continuous layer having a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer, wherein the first continuous layer is disposed between the one or more magnetic granular recording layers and the second continuous layer.

2. The magnetic recording stack of claim 1, further comprising:

15 one or more underlayers disposed between the substrate and the one or more magnetic granular recording layers.

3. The magnetic recording stack of claim 1, further comprising:

an overcoat disposed over the second continuous layer.

4. The magnetic recording stack of claim 1, wherein the one or more underlayers includes a soft magnetic underlayer, an adhesion layer, and one or more
20 interlayers.

5. The magnetic recording stack of claim 1, wherein a thickness of the first continuous layer is greater than a thickness of the second continuous layer.

6. The magnetic recording stack of claim 1, wherein a saturation magnetization
25 of the second continuous layer is larger than the saturation magnetization of the first continuous layer.

7. The magnetic recording stack of claim 1, wherein a material content of the first continuous layer and the second continuous layer comprises a Co alloy with one or more elements selected from: Cr, Pt, Ni, Ta, B, Nb, O, Ti, Mo, Cu, Ag, Ge, and Fe.

8. A magnetic recording stack comprising:

a substrate;

one or more magnetic granular recording layers disposed over the substrate, each of the one or more magnetic granular recording layers having a lateral exchange coupling;

5 a first continuous layer having an intermediate lateral exchange coupling higher than the lateral exchange coupling of the one or more magnetic granular recording layers; and

a second continuous layer having a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer, wherein a thickness of the first continuous layer is greater than a thickness of the second continuous layer and a saturation

10 magnetization of the second continuous layer is higher than a saturation magnetization of the first continuous layer.

9. The magnetic recording stack of claim 8, wherein the thickness of the first continuous layer ranges between 10-80Å and the thickness of the second continuous layer ranges between 2-20Å.

15 10. The magnetic recording stack of claim 8, wherein the thickness of the first continuous layer ranges between 20-60Å and the thickness of the second continuous layer ranges between 3-15Å.

11. The magnetic recording stack of claim 8, wherein the saturation magnetization of the first continuous layer ranges between 10-800 emu/cm³ and the
20 saturation magnetization of the second continuous layer ranges between 100-1200 emu/cm³.

12. The magnetic recording stack of claim 8, wherein the saturation magnetization of the first continuous layer ranges between 100-600 emu/cm³ and the saturation magnetization of the second continuous layer ranges between 200-1000 emu/cm³.

13. The magnetic recording stack of claim 8, wherein the saturation
25 magnetization of the first continuous layer ranges between 200-500 emu/cm³ and the saturation magnetization of the second continuous layer ranges between 400-900 emu/cm³.

14. The magnetic recording stack of claim 8, wherein a material content of the first continuous layer and the second continuous layer comprises a Co alloy with one or more elements selected from: Cr, Pt, Ni, Ta, B, Nb, O, Ti, Mo, Cu, Ag, Ge, and Fe.

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15. A method comprising:

depositing one or more underlayers on a substrate;

depositing one or more magnetic granular recording layers on the one or more underlayers, the one or more magnetic granular recording layers each having a lateral

5 exchange coupling;

depositing a first continuous layer on the one or more magnetic granular recording layers, the first continuous layer having an intermediate lateral exchange coupling higher than the lateral exchange coupling of the one or more magnetic granular recording layers; and

10 depositing a second continuous layer on the first continuous layer, the second continuous layer having a higher lateral exchange coupling than the lateral exchange coupling of the first continuous layer.

16. The method of claim 15, further comprising:

depositing an overcoat on the second continuous layer.

15 17. The method of claim 15, wherein a thickness of the first continuous layer is greater than a thickness of the second continuous layer.

18. The method of claim 15, wherein a saturation magnetization of the second continuous layer is higher than a saturation magnetization of the first continuous layer.

20 19. The method of claim 15, wherein a material content of the first continuous layer and the second continuous layer comprises a Co alloy with one or more elements selected from: Cr, Pt, Ni, Ta, B, Nb, O, Ti, Mo, Cu, Ag, Ge, and Fe.

25 20. The method of claim ~~15~~17, wherein the thickness of the first continuous layer ranges between 10-80Å and the thickness of the second continuous layer ranges between 2-20Å and wherein the saturation magnetization of the first continuous layer ranges between 10-800 emu/cm³ and the saturation magnetization of the second continuous layer ranges between 100-1200 emu/cm³.