

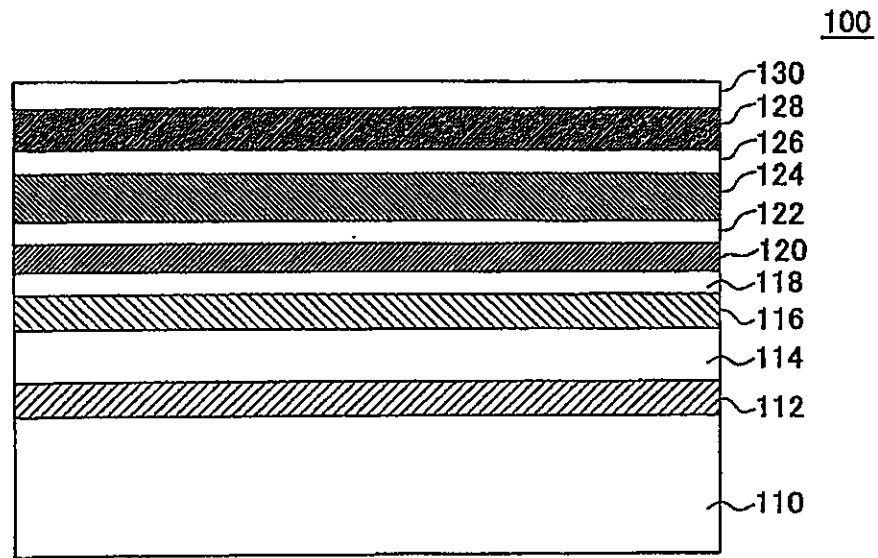


FIG. 1

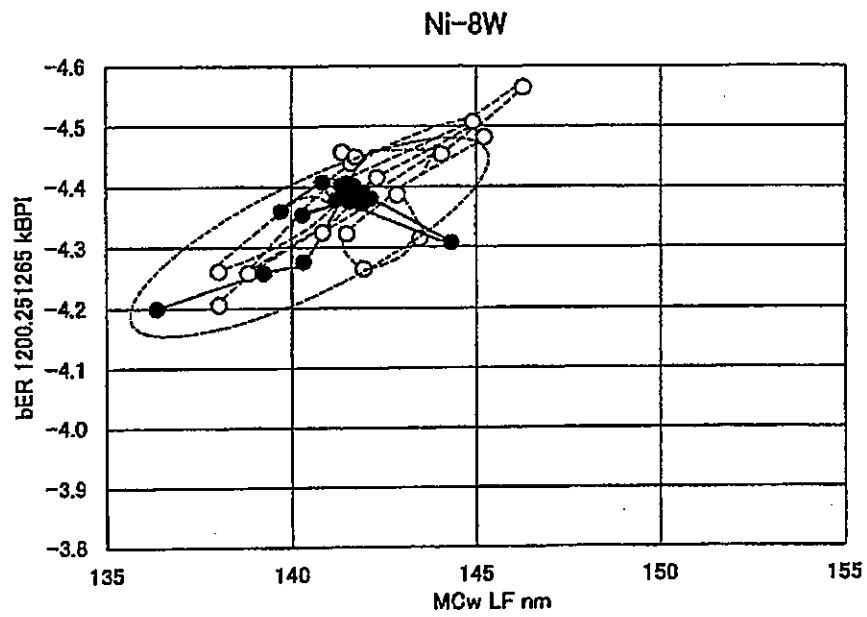


FIG. 2

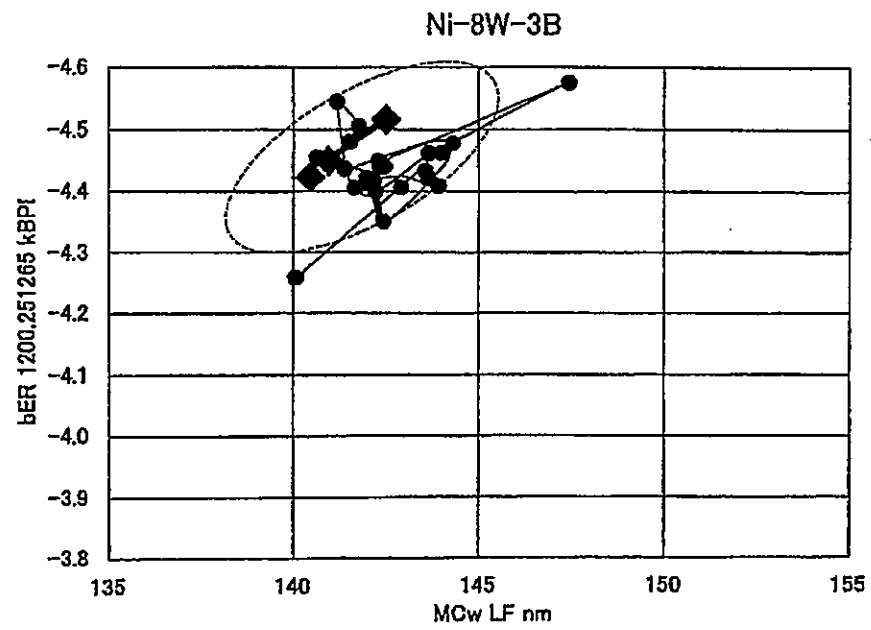


FIG. 3

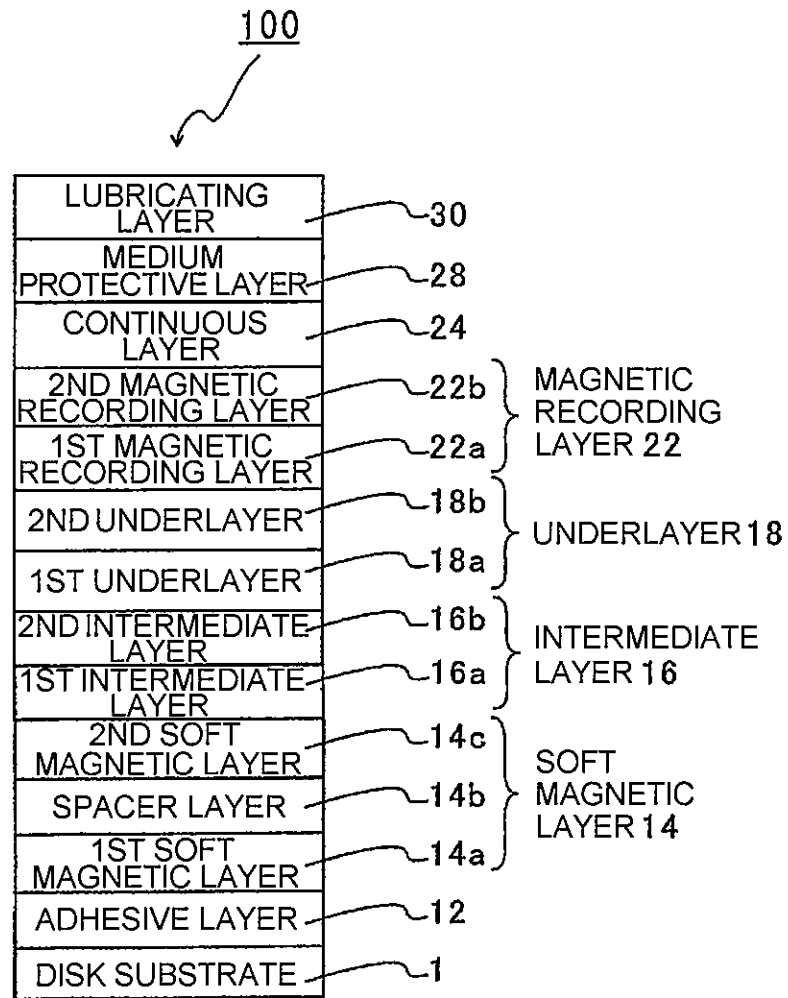


FIG. 4

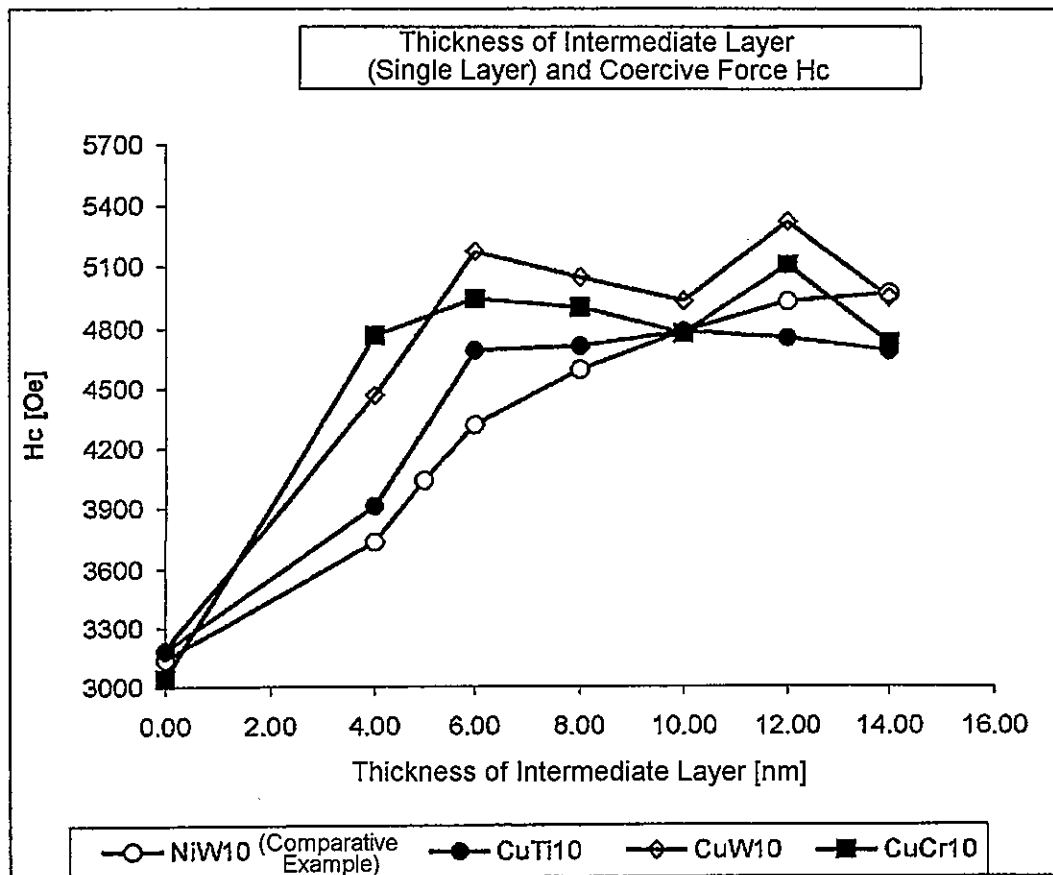


FIG. 5

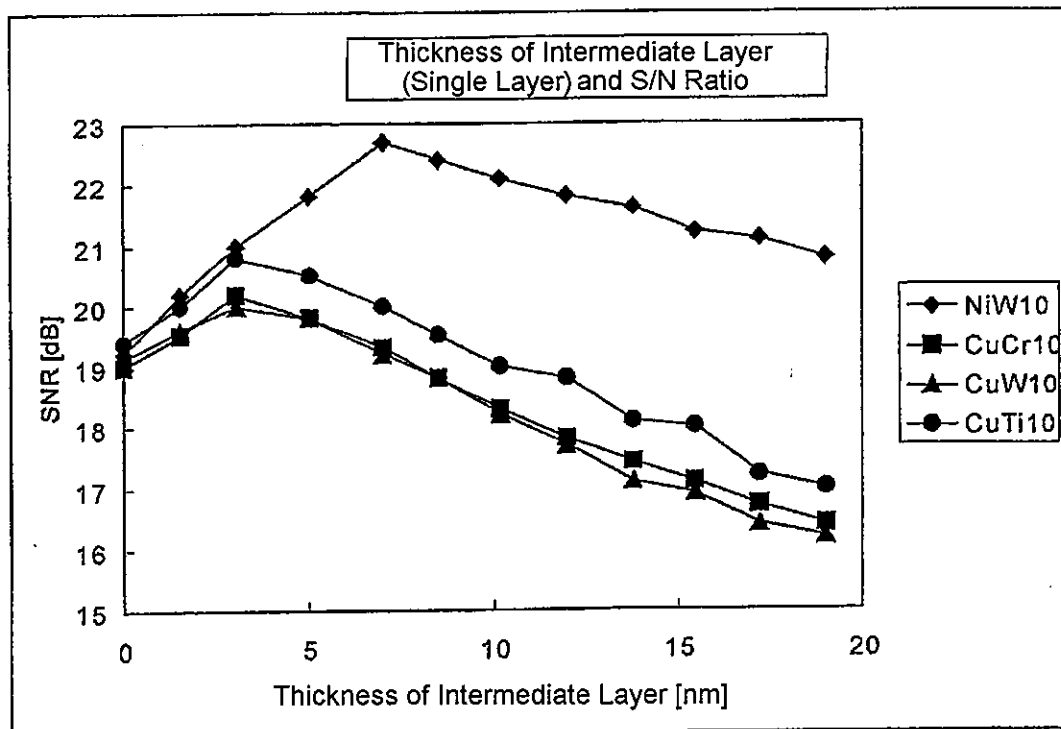


FIG. 6

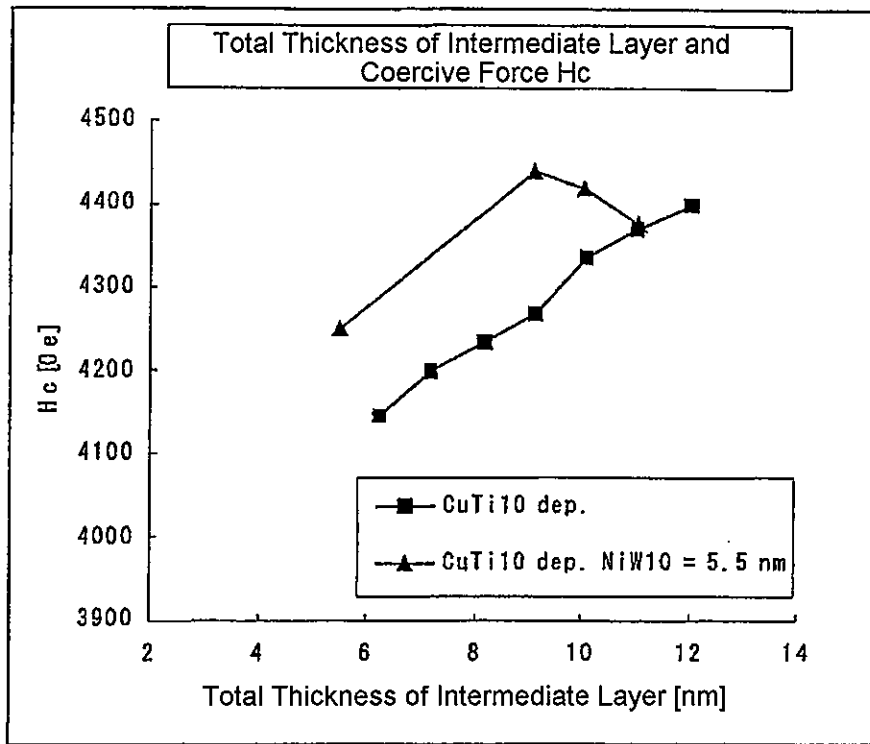


FIG. 7

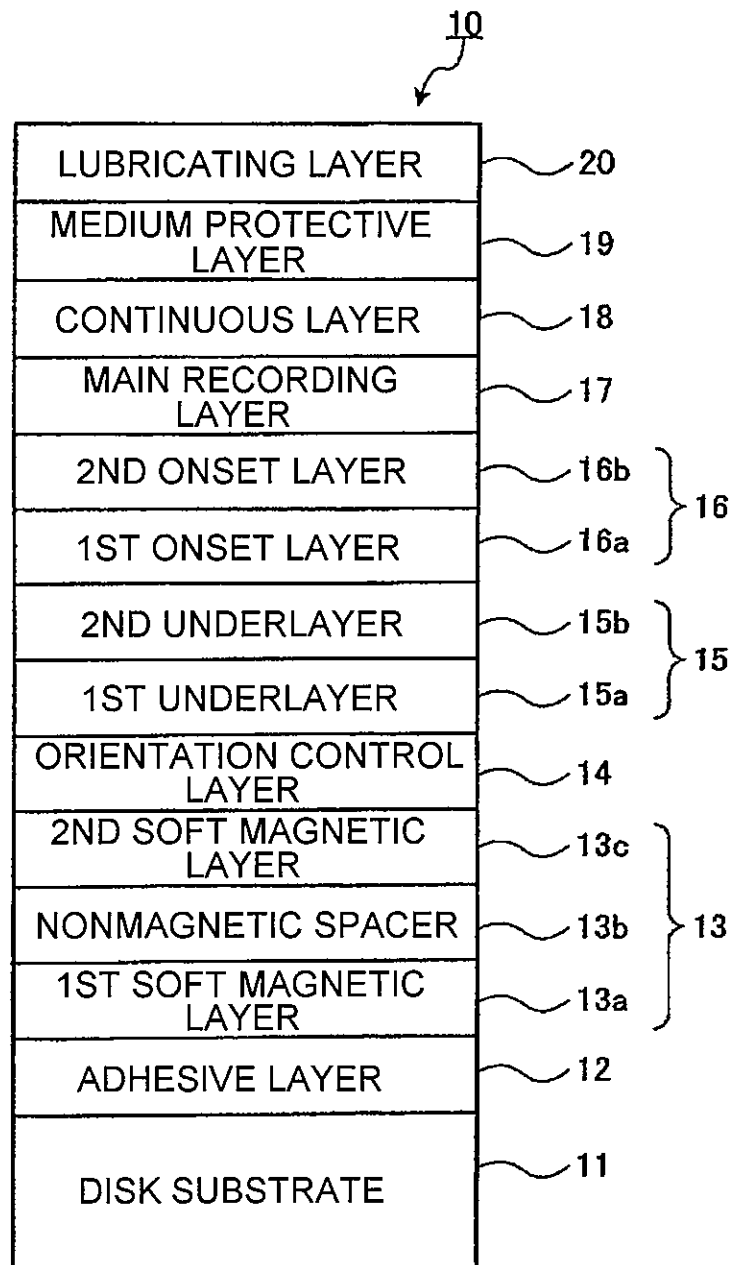


FIG. 8

	Orientation Control Layer Material	Underlayer Material	Magnetic Grain Size [nm]	Ru(002) peak $\Delta\theta_{50}$ [°]	S/N [dB]
Comparative Example 1	NiW (Ni: 92at%, W: 8at%)	Ru	8.5	3.0	20.5
Comparative Example 2	NiW-TiO ₂ (Ni: 86at%, W: 8at%, TiO ₂ : 6at%)	Ru-SiO ₂ (Ru: 95at%, SiO ₂ : 5at%)	7.7	3.6	20.8
Comparative Example 3	NiW (Ni: 92at%, W: 8at%)	Ru-SiO ₂ (Ru: 95at%, SiO ₂ : 5at%)	8.1	3.5	20.7
Example 1	NiW-TiO ₂ (Ni: 86at%, W: 8at%, TiO ₂ : 6at%)	Ru	7.7	3.1	21.2
Example 2	NiW-TiO ₂ (Ni: 89at%, W: 8at%, TiO ₂ : 3at%)	Ru	8.1	3.0	21.0
Example 3	NiW-SiO ₂ (Ni: 87at%, W: 8at%, SiO ₂ : 5at%)	Ru	7.5	3.2	21.3
Example 4	NiW-Cr ₂ O ₃ (Ni: 82at%, W: 7at%, Cr ₂ O ₃ : 11at%)	Ru	7.9	3.1	21.0
Example 5	NiW-Ta ₂ O ₅ (Ni: 62at%, W: 5at%, Ta ₂ O ₅ : 33at%)	Ru	7.8	3.1	21.1
Example 6	NiW-Nb ₂ O ₅ (Ni: 74at%, W: 6at%, Nb ₂ O ₅ : 20at%)	Ru	7.9	3.2	21.0
Example 7	NiW-Al ₂ O ₃ (Ni: 85at%, W: 7at%, Al ₂ O ₃ : 8at%)	Ru	7.7	3.1	21.2
Example 8	NiPd-TiO ₂ (Ni: 86at%, Pd: 8at%, TiO ₂ : 6at%)	Ru	7.9	3.0	21.0
Example 9	NiCr-TiO ₂ (Ni: 86at%, Cr: 8at%, TiO ₂ : 6at%)	Ru	7.8	3.0	21.0
Example 10	NiMo-TiO ₂ (Ni: 86at%, Mo: 8at%, TiO ₂ : 6at%)	Ru	7.8	3.1	21.0
Example 11	NiTa-TiO ₂ (Ni: 86at%, Ta: 8at%, TiO ₂ : 6at%)	Ru	7.8	3.1	21.1
Example 12	NiV-TiO ₂ (Ni: 86at%, V: 8at%, TiO ₂ : 6at%)	Ru	7.7	3.2	20.9
Example 13	NiNb-TiO ₂ (Ni: 86at%, Nb: 8at%, TiO ₂ : 6at%)	Ru	7.8	3.0	21.0
Example 14	NiZr-TiO ₂ (Ni: 86at%, Zr: 8at%, TiO ₂ : 6at%)	Ru	7.7	3.1	21.1
Example 15	NiHf-TiO ₂ (Ni: 86at%, Hf: 8at%, TiO ₂ : 6at%)	Ru	7.9	3.1	21.0
Example 16	NiCu-TiO ₂ (Ni: 86at%, Cu: 8at%, TiO ₂ : 6at%)	Ru	7.9	3.1	21.0

FIG. 9