[0047] Fabrication of a dual spin valve (DSV) using a platinum manganese pinned layer capped with tantalum nitride was also undertaken. **FIG. 7** shows the DR/R versus applied field loop (oriented parallel to the pinned field) for a dual spin valve with a tantalum nitride cap layer. This conformation also provided a spin valve with a cap layer with superior protective properties against oxidation and corrosion during fabrication

[0048] Example 3: HGA results of stacks in accordance with the invention

[0049] Table 1 illustrates Head Gimbal Assembly (HGA) results from ten recording heads tested at HGA level. The heads were tested at 10 K revolutions per minute.

Head Number	Low Frequency Amplitude (LFA)-Avg.	High Frequency Amplitude (HFA)-Avg.	Read Width-microinch (μin)	Write Width-microinch (μin)
1	1938.819	1385.695	4.272	21.033
2	1576.31	1106.522	3.931	20.938
3	1556.521	1052.535	3.785	18.099
4	1500.86	1124.557	4.866	18.896
5	2512.281	2137.324	6.411	23.38
6	2292.966	1672.081	4.558	20.016
7	2493.438	1534.303	3.987	18.533
8	2564.118	1869.627	4.036	19.236
9	2183.145	1743.639	5.068	21.7
10	2785.398	2681.147	4.948	22.736
AVERAGE	2140.386	1630.743	4.5862	20.4567
STDEV	470.5024	512.7484	0.78907116	1.802157

The normalized low frequency amplitude/micrometer (LFA/μm) was 6–7 millivolts/micrometer (mv/μm).

[0050] The above specification, examples and data provide a complete description of manufacture and use of the composition of the invention. Since many embodiments of the invention can be made without departing from the spirit and scope of the invention, the invention resides in the claims hereinafter appended.

The claimed invention is:

1. A spin valve sensor, said spin valve sensor comprising a cap layer and a free layer, said cap layer comprising tantalum nitride.

2. The spin valve sensor of claim 1, wherein said spin valve sensor cap layer is a monolayer.

3. The spin valve sensor of claim 1, wherein said spin valve sensor cap layer comprises a bilayer.

4. The spin valve sensor of claim 3, wherein said cap layer bilayer comprises a first layer and a second layer.

5. The spin valve sensor of claim 4, wherein said bilayer second layer comprises a metal selected from the group of ruthenium, gold, silver, copper and mixtures thereof, and said bilayer first layer comprises tantalum nitride.

6. The spin valve of claim 4, wherein said second layer comprises copper.

7. The spin valve of claim 5, wherein said first layer of said bilayer lies adjacent said free layer.

8. The spin valve of claim 1, wherein said spin valve comprises a first pinned layer and a second pinned layer.

9. The spin valve of claim 8, wherein said cap layer comprises tantalum nitride.

10. The spin valve sensor of claim 2, wherein said cap layer has a thickness of from about 20 to 200 angstroms.

11. The spin valve sensor of claim 3, wherein said cap layer has a thickness of from about 20 to 220 angstroms.

12. The spin valve sensor of claim 4, wherein said bilayer first layer has a thickness of from about 20 to 200 angstroms, and said bilayer second layer has a thickness of from about 3 to 20 angstroms.

13. The spin valve sensor of claims **1** or **4**, wherein said spin valve sensor is a bottom pinned spin valve.

14. The spin valve sensor of claims **1** or **4**, wherein said spin valve sensor is a top pinned spin valve.

15. The spin valve sensor of claims **1** or **4**, wherein said spin valve sensor is a dual spin valve.

16. A dual pinned spin valve sensor comprising:

(a) a seed layer comprising nickel, chromium, tantalum, titanium, manganese, copper, tungsten, platinum, gold, silver, or mixtures thereof;

(b) an antiferromagnetic layer, positioned on top of said seed layer, comprising platinum, manganese, nickel, chromium, iridium, rhodium, paladium, copper, ruthenium, iron, or mixtures thereof;

(c) a pinned layer, positioned on top of said antiferromagnetic layer, comprising cobalt, iron, nickel, chromium, platinum, tantalum, or mixtures thereof;

(d) a spacer layer, positioned on top of said pinned layer, comprising copper, silver, gold, or mixtures thereof;

(e) a free layer, positioned on top of said spacer layer, comprising nickel, cobalt, iron, or mixtures thereof;

(f) a second pinned layer, positioned on top of said free layer, comprising cobalt, iron, nickel, chromium, platinum, tantalum, or mixtures thereof;

(g) a second antiferromagnetic layer, positioned on top of said second pinned layer, comprising platinum, manganese, nickel, chromium, iridium, rhodium, paladium, copper, ruthenium, iron, or mixtures thereof; and

(h) a cap layer, positioned on top of said second antiferromagnetic layer, comprising tantalum nitride.

17. A bottom pinned spin valve sensor comprising:

(a) a seed layer comprising nickel, chromium, tantalum, titanium, manganese, copper, tungsten, platinum, gold, silver, or mixtures thereof;

(b) an antiferromagnetic layer, positioned on top of said seed layer, comprising platinum, manganese, nickel, chromium, iridium, rhodium, paladium, copper, ruthenium, iron, or mixtures thereof;

(c) a pinned layer, positioned on top of said antiferromagnetic layer, comprising cobalt, iron, nickel, chromium, platinum, tantalum, or mixtures thereof,

(d) a spacer layer, positioned on top of said pinned layer, comprising copper, silver, gold, or mixtures thereof;

(e) a free layer, positioned on top of said spacer layer, comprising nickel, cobalt, iron, or mixtures thereof; and

(f) a cap layer, positioned on top of said free layer, comprising tantalum nitride.