

passing an electrical current through said electrolytic bath between said electrical conductive portion of said substrate and said counter electrode; and

depositing at least a portion of said at least one ferromagnetic material into at least a portion of said three dimensional pattern wherein said at least one deposited ferromagnetic material is substantially void-free.

12. The process of claim **11** wherein said process step of passing an electrical current through said electrolytic bath between said electrical conductive portion of said substrate and said counter electrode is such that the potential between the said substrate and a reference electrode is at a value negative of $-0.8V$ SCE.

13. The process of claim **11** wherein said process step of passing an electrical current through said electrolytic bath between said electrical conductive portion of said substrate and said counter electrode is at an applied current density in the range of 0.1 to 50 mA/cm² of the area of the electrically conductive portion of the substrate.

14. The process of claim **11** wherein said at least one accelerating, inhibiting, or depolarizing additive comprises a nitrogen containing compound.

15. The process of claim **11** wherein said at least one accelerating, inhibiting, or depolarizing additive has a compound selected from the group consisting of cationic surfactants, anionic surfactants, nonionic surfactants, heterocyclic benzimidazole derivatives, and combinations thereof.

16. The process of claim **11** wherein said at least one accelerating, inhibiting, or depolarizing additive comprises a compound selected from the group consisting of polyethyleneimine, 2-mercapto-5-benzimidazolesulfonic acid, and combinations thereof.

17. The process of claim **11** wherein said at least one accelerating, inhibiting, or depolarizing additive comprises polyethyleneimine.

18. The process of claim **11** wherein said at least one accelerating, inhibiting, or depolarizing additive comprises 2-mercapto-5-benzimidazolesulfonic acid.

19. The process of claim **18** wherein said 2-mercapto-5-benzimidazolesulfonic acid is in said electrolytic bath at a concentration of at least 50 μ mol/L.

20. A process of electrodepositing at least one ferromagnetic material into a three dimensional pattern within a substrate comprising:

providing a substrate material having an electrical conductive three dimensional recessed pattern in a surface thereof;

preparing an electrolytic bath comprising said at least one ferromagnetic material and at least one accelerating, inhibiting, or depolarizing additive;

said at least one ferromagnetic material comprising at least one metal cation selected from the group consisting of Ni²⁺, Co²⁺, Fe²⁺, Fe³⁺, and combinations thereof;

said at least one accelerating, inhibiting, or depolarizing additive comprising an additive selected from the group consisting of polyethyleneimine, 2-mercapto-5-benzimidazolesulfonic acid, and combinations thereof;

placing said electrical conductive three dimensional recessed pattern in said substrate into said electrolytic bath;

contacting said electrical conductive three dimensional recessed pattern in said substrate with said electrolytic bath;

placing a counter electrode into said electrolytic bath;

passing an electrical current through said electrolytic bath between said electrical conductive three dimensional recessed pattern in said substrate and said counter electrode; and

depositing at least a portion of said at least one ferromagnetic material into at least a portion of said three dimensional recessed pattern in said substrate wherein said at least one deposited ferromagnetic material is substantially void-free.

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