

What is claimed is:

1. A catheter comprising polymer tubing, wherein at least a portion of the polymeric tubing comprises a magnetized portion which has been magnetized by an externally applied magnetic field.
- 5 2. The catheter according to claim 1, wherein the magnetized portion includes a magnetized composition comprising a magnetic material dispersed in a polymer.
3. The catheter according to claim 2, wherein the wherein the magnetized composition
10 forms a magnetized layer on the polymeric tubing is a magnetized outer layer surrounding a non-magnetizable inner layer.
4. The catheter according to claim 1, wherein the magnetized portion further comprises a radiopaque component.
- 15 5. The catheter according to claim 4, wherein the radiopaque component is selected from the group consisting of barium sulfate, bismuth subcarbonate, bismuth oxychloride, bismuth trioxide, tungsten and mixtures thereof.
- 20 6. The catheter according to claim 3, wherein the magnetized composition further comprises a radiopaque component selected from the group consisting of barium sulfate, bismuth subcarbonate, bismuth oxychloride, bismuth trioxide, tungsten and mixtures thereof.
7. The catheter according to claim 1, wherein the magnetized portion forms magnetized
25 longitudinal segments between an inner surface and an outer surface of the tubing, wherein the magnetized longitudinal segments are separated by longitudinal non-magnetizable segments.
8. The catheter according to claim 7, wherein the magnetized portion comprises a magnetized composition.
- 30 9. The catheter according to claim 7, wherein the magnetized portion comprises magnetized wires co-formed with the polymeric tubing.

10. The catheter according to claim 7, wherein the magnetized portion further comprises a radiopaque component.

11. The catheter according to claim 10, wherein the radiopaque component is selected from
5 the group consisting of barium sulfate, bismuth subcarbonate, bismuth oxychloride, bismuth trioxide, tungsten and mixtures thereof.

12. The catheter according to claim 2, wherein the magnetic material is dispersed
10 uniformly within the at least a portion of the polymer.

13. The catheter according to claim 1, wherein the magnetized portion forms magnetized
longitudinal segments between an inner surface and an outer surface of the catheter and the
magnetized longitudinal segments are separated by non-magnetizable longitudinal segments
comprising a radiopaque material.

14. The catheter according to claim 2, wherein the magnetic material is selected from the
15 group consisting of powdered iron; magnetic iron oxide; magnetic titanium oxide; magnetic powdered steel; magnetic iron alloys; paramagnetic or ferromagnetic compounds containing one of chromium, magnesium, and molybdenum; and mixtures thereof.

15. The catheter according to claim 14, wherein the magnetic iron alloy is an alloy with
20 nickel, zinc, and/or copper.

16. The catheter according to claim 2, wherein the magnetic material in the magnetized
25 composition is less than 15% (w/w) of the polymer.

17. The catheter according to claim 16, wherein the magnetic material in the magnetized
composition is less than 10% (w/w) of the polymer.

18. The catheter according to claim 16, wherein the magnetic material in the magnetized
30 composition is less than 5% (w/w) of the polymer.

19. A vascular access device comprising the polymeric catheter according to claim 1.

20. The vascular access device according to claim 19, the polymeric catheter having a proximal end and a distal end, the device further comprising:

5 a catheter adapter having a distal end, a proximal end, an overall length extending from the distal end to the proximal end, an internal cavity, an upper portion, a lower portion and a tip region having a distal opening having a circumference through which the polymeric catheter extends, the catheter adapter being connected to the proximal end of the polymeric catheter, and a needle cannula disposed with the polymeric catheter, the magnetized portion of
10 the polymeric catheter having a magnetic field that is detectable by a magnetometer.

21. Use of a magnetized polymeric catheter for locating a polymeric catheter within a patient's vasculature, wherein at least a portion of the polymeric catheter comprises a magnetized portion including a magnetic material dispersed in a polymer, and wherein strength
15 and direction of a magnetic field produced by the polymeric catheter in the patient's vasculature is measured using a magnetometer outside the patient's body.

22. The use according to claim 21, further comprising detecting placement of a needle contained within the polymeric catheter using an ultrasound imaging system prior to locating
20 the polymeric catheter.

23. The use according to claim 22, further comprising displaying an image of the polymeric catheter superimposed over an ultrasound image of the needle.

25 24. The use according to claim 21, wherein the magnetized composition is magnetized to produce a magnetic field B at a distance x through tissue of permeability μ , and the correlation is calculated as $x = f(B, \mu_r)$.

25. The use according to claim 23, wherein three magnetometers placed orthogonally to
30 each other are used to derive a 3-dimensional correlation $I = f(B_i, \mu_r)$, wherein $i = x$ or y or z along three axes.