CLAIMS:

1. A heat exchanger having enhanced corrosion resistance comprising:

at least one metal tube including a passive layer arranged at an outer surface, wherein the passive layer has been plastically deformed to remove or refine at least one intermetallic particle therefrom, wherein the at least one intermetallic particle comprises a second phase particle located near the surface of the metal tube that acts as one of a cathode and anode to an anode or cathode in the metal tube.

2. The heat exchanger having enhanced corrosion resistance according to claim 1, wherein the metal is an aluminum alloy selected from one of a 3000 series, a 4000 series, a 5000 series, a 6000 series and an 8000 series.

3. The heat exchanger having enhanced corrosion resistance according to claim 1, wherein the plastic deformation of the surface of the tube creates a compressive residual stress having a magnitude and depth.

4. A method for manufacturing a tube for a heat exchanger having an improved corrosion resistance comprising:

extruding a metal into a tube; and

plastically deforming a surface microstructure of the tube to remove or refine at least one intermetallic particle therefrom, wherein the at least one intermetallic particle comprises a second phase particle located near the surface of the tube that acts as one of a cathode and anode to an anode or cathode in the tube.

5. The method for manufacturing a tube for a heat exchanger having an improved corrosion resistance according to claim 10, wherein the metal is an aluminum alloy selected from one of a 3000 series, a 4000 series, a 5000 series, a 6000 series, and an 8000 series.

6. A method for manufacturing a tube for a heat exchanger having an improved corrosion resistance comprising:

forming a sheet of metal into a tube of a desired shape;

bonding the edges of the metal together to seal the tube; and

plastically deforming a surface microstructure of the tube to remove or refine at least one intermetallic particle therefrom, wherein the at least one intermetallic particle comprises a second phase particle located near the surface of the tube that acts as one of a cathode and anode to an anode or cathode in the tube.

7. The method for manufacturing a tube for a heat exchanger according to claim 6, wherein the metal is an aluminum alloy selected from one of a 3000 series, a 4000 series, a 5000 series, a 6000 series, and an 8000 series.

CLAIMS:

1. A heat exchanger having enhanced corrosion resistance comprising:

at least one metal tube including a passive layer arranged at an outer surface, wherein a new microstructure of the passive layer has been created to remove or refine at least one intermetallic particle therefrom, wherein the at least one intermetallic particle comprises a second phase particle located near the surface of the metal tube that acts as one of a cathode and anode to an anode or cathode in the metal tube.

2. The heat exchanger having enhanced corrosion resistance according to claim 1, wherein the metal is an aluminum alloy selected from one of a 3000 series, a 4000 series, a 5000 series, a 6000 series and an 8000 series.

3. The heat exchanger having enhanced corrosion resistance according to claim 1, wherein the plastic deformation of the surface of the tube creates a compressive residual stress having a magnitude and depth.

4. A method for manufacturing a tube for a heat exchanger having an improved corrosion resistance comprising:

extruding a metal into a tube; and

creating a new surface microstructure of the tube to remove or refine at least one intermetallic particle therefrom, wherein the at least one intermetallic particle comprises a second phase particle located near the surface of the tube that acts as one of a cathode and anode to an anode or cathode in the tube.

5. The method for manufacturing a tube for a heat exchanger having an improved corrosion resistance according to claim 10, wherein the metal is an aluminum alloy selected from one of a 3000 series, a 4000 series, a 5000 series, a 6000 series, and an 8000 series.

6. A method for manufacturing a tube for a heat exchanger having an improved corrosion resistance comprising:

forming a sheet of metal into a tube of a desired shape;

bonding the edges of the metal together to seal the tube; and

creating a new surface microstructure of the tube to remove or refine at least one intermetallic particle therefrom, wherein the at least one intermetallic particle comprises a second phase particle located near the surface of the tube that acts as one of a cathode and anode to an anode or cathode in the tube.

7. The method for manufacturing a tube for a heat exchanger according to claim 15, wherein the metal is an aluminum alloy selected from one of a 3000 series, a 4000 series, a 5000 series, a 6000 series, and an 8000 series.