

Claims

What is claimed is:

1. A coated article, comprising:
 - an aluminum-containing substrate;
 - a first region on the aluminum-containing substrate, the first region comprising carbon and silicon;
 - a second region distal from the aluminum-containing substrate in comparison to the first region, the second region having oxygen at a greater concentration, by weight, than the first region;
 - a third region distal from the first region in comparison to the second region, the third region comprising amorphous silicon.
2. The coated article of claim 1, wherein the coated article has increased corrosion resistance when contacted with a first corrosive fluid comprising at least 5%, by weight, HCl in comparison to the aluminum-containing substrate in uncoated form.
3. The coated article of claim 1, wherein the aluminum-containing substrate is devoid of thermal sensitization effects that occur at temperatures greater than 450 degrees Celsius.
4. The coated article of claim 1, wherein the first region is directly on the aluminum-containing substrate and completely covers all exposed regions of the aluminum-containing substrate, wherein the second region is directly on the first region and completely covers all exposed regions of the first region, and wherein the third region is directly on the second region and completely covers all exposed regions of the second region.
5. The coated article of claim 1, wherein the first region is a thermal chemical vapor deposition of a dimethylsilane-and-silane-containing mixture.
6. A fluid contact process, comprising:
 - flowing a corrosive fluid to contact a coated article, the coated article having an aluminum-containing substrate, a first region on the aluminum-containing substrate, the first region comprising carbon and silicon, a second region distal from the

aluminum-containing substrate in comparison to the first region, the second region having oxygen at a greater concentration, by weight, than the first region, and a third region distal from the first region in comparison to the second region, the third region comprising amorphous silicon.

7. The fluid contact process of claim 6, wherein the coated article is used in analytical instrumentation industries.
8. The fluid contact process of claim 6, wherein the coated article is used in oil and gas industries.
9. The fluid contact process of claim 6, wherein the coated article is used in transportation and logistics.
10. The fluid contact process of claim 6, wherein the coated article is used in facilities management.
11. The fluid contact process of claim 6, wherein the coated article is used in food and beverage industries.
12. The fluid contact process of claim 6, wherein the coated article is used in aviation, defense, or aerospace industries.
13. The fluid contact process of claim 6, wherein the coated article is used in automotive industries.
14. The fluid contact process of claim 6, wherein the coated article is used in medical or pharmaceutical industries.
15. A coating process, comprising:
 - positioning an aluminum-containing substrate within an enclosed chamber; then,
 - thermally decomposing a dimethylsilane-and-silane-containing mixture within the enclosed chamber thereby applying carbon and silicon to all exposed surfaces within the enclosed chamber to produce a first region; then,
 - thermally oxidizing the first region thereby producing a second region distal from the aluminum-containing substrate in comparison to the first region, the second

region having oxygen at a greater concentration, by weight, than the first region; and then,

thermally decomposing silane within the enclosed chamber thereby producing a third region distal from the first region in comparison to the second region, the third region comprising amorphous silicon.