## CLAIMS

What is claimed is:

1. An article comprising:

a substrate comprising a first surface and a second surface, the second surface in contact with an outside environment.

wherein the substrate comprises a polymer comprising poly(trimethylene furandicarboxylate) (PTF), and

wherein the polymer provides an improvement in gas barrier properties of the substrate as compared to a substrate consisting of nascent poly(ethylene terephthalate) (PET),

wherein the improvement for oxygen is in the range of 2–99%, an improvement for carbon dioxide is in the range of 11–99%, and an improvement for moisture is in the range of 3–99%.

~~2. The article of Claim 1, wherein polymer provides an improvement in the range of 50–98% in oxygen barrier properties of the substrate.~~

~~3. The article of Claim 1, wherein polymer provides an improvement in the range of 50–98% in carbon dioxide barrier properties of the substrate.~~

~~4. The article of Claim 1, wherein polymer provides an improvement in the range of 25–75% in moisture barrier properties of the substrate.~~

~~5.~~2. The article of Claim 1, wherein the polymer has a crystallinity of less than 100 J/g, as measured by differential scanning calorimetry with heating rates of 10 °C/min.

6.3. The article of Claim 1, wherein the polymer is a polymer blend comprising poly(trimethylene furandicarboxylate) (PTF) and poly(alkylene furandicarboxylate), and wherein the polymer comprises 0.1−99.9% by weight of PTF based on the total weight of the polymer blend.

7.4. The article of Claim 1, wherein the polymer is a polymer blend comprising poly(trimethylene furandicarboxylate) (PTF) and poly(alkylene terephthalate), and

wherein the polymer comprises 0.1−99.9% by weight of PTF based on the total weight of the polymer blend.

~~8. The article of Claim 1, wherein the polymer is a copolymer derived from 2,5-furan dicarboxylic acid at least one of a diol or a polyol monomer, and at least one of a polyfunctional acid or a hydroxyl acid, present in a molar ratio of 1:100 to 100, and wherein the molar ratio of diol to diacid is at least 1.2:1.~~

9.5. The article of Claim 1, wherein the substrate comprises a polymer disposed in between and in contact with a first layer and a second layer, wherein the first layer is in contact with the first surface of the substrate and the second layer is in contact with the second surface of the substrate,

wherein the polymer comprises poly(trimethylene furandicarboxylate) (PTF), and

wherein the amount of polymer is in the range of 0.1−99.9% by weight based on the total weight of the first layer, polymer, and the second layer.

~~10. The article of Claim 8, wherein at least one of the first layer or the second layer comprises poly(ethylene terephthalate).~~

11.6. The article of Claim ~~8~~1, wherein at least one of the first layer or the second layer comprises at least one of PTF, PET, HDPE, LDPE, PE, PP or

EvOH.

~~12.~~7. The article of Claim 1, wherein the substrate is in a form of a housing provided with a port for introducing a material, such that the material is in contact with the first surface of the substrate.

~~13.~~8. The article of Claim ~~12~~ 7 further comprising means for closing the port, such that upon closing the port, the material is isolated from the outside environment.

~~14.~~9. The article of Claim ~~12~~7, wherein the article comprises one or more of a container, a container and a lid, or a container and a closure.

~~15.~~10. An article according to Claim ~~12~~7, wherein the article comprises a beverage container.

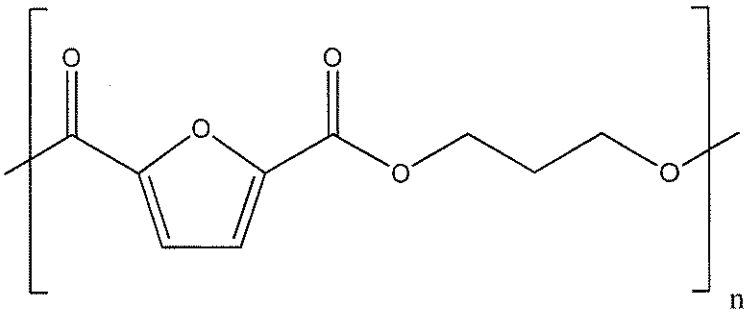
~~16.~~11. The article of Claim 1, wherein the substrate is in the form of a film or a sheet.

~~17.~~12. The article of Claim 1 wherein the polymer is disposed on at least one of the first surface or the second surface of the substrate as a coating.

~~18.~~13. The article of claim ~~17~~12, wherein the polymer coating provides abrasion resistance to the substrate.

~~19.~~14. The article of claim ~~17~~12, wherein the at least one of the first surface or the second surface of the substrate comprises metal or plastic.

~~20.~~15. A polymer composition comprising a polymer having a repeating unit of the formula:



wherein n is less than 185.

~~21. The polymer composition of Claim 20, wherein n is in the range 80–185.~~