Claims

What is claimed is:

1. A drag reducing agent (10, 20, 30) characterized by:

a core (12, 22, 32) comprising a polyolefin and a deactivated polymerization catalyst; and

a temporary container (11, 21, 31) encapsulating the core, the temporary container comprising a container material, which includes an ethylene vinyl acetate copolymer, an ethylene vinyl alcohol copolymer, a polyvinylpyrrolidone, an ethylene vinylpyrrolidone copolymer, a vinylpyrrolidone vinyl acetate copolymer, a polysaccharide or its derivative, or a combination comprising at least one of the foregoing;

wherein a largest dimension of the drag reducing agent is greater than 1,000 microns.

2. The drag reducing agent of claim 1, wherein the largest dimension of the drag reducing agent is greater than 0.5 centimeters and up to 30 centimeters.

3. The drag reducing agent of claim 1, wherein the temporary container has two or more layers, and at least one layer comprises the container material.

4. The drag reducing agent of claim 3, wherein each of the two or more layers independently comprises the container material.

5. The drag reducing agent of claim 1, wherein the temporary container has an inner surface and an opposing outer surface (31E), and a coating (31F) is disposed on at least one of the inner and outer surfaces of the temporary container, the coating comprising a wax, a silicone, or a combination comprising at least one of the foregoing.

6. The drag reducing agent of claim 1, wherein the temporary container has a thickness of 1 to 1,000 microns.

7. The drag reducing agent of claim 1, wherein the temporary container fully encapsulate the core.

8. The drag reducing agent of claim 1, wherein polyolefin is polymerized within the temporary container from a drag reducing agent forming component comprising (i) at least one olefin monomer, or (ii) at least one olefin oligomer, or a combination of (i) and (ii).

9. The drag reducing agent of claim 8, wherein the drag reducing agent forming component further comprises at least one styrene, a vinyl acetate, a vinylalkylene carboxylic ester, an oligomer of the vinylalkylene carboxylic ester, or a combination thereof.

10. The drag reducing agent of claim 1, wherein the polyolefin is present in an amount of 80 wt% to 99.99 wt%, based on the total weight of the drag reducing agent.

11. A composition comprising the drag reducing agent of any one of claims 1 to 10.

12. A process of manufacturing a drag reducing agent (10, 20, 30), the process characterized by:

injecting a catalyst and a drag reducing agent forming component comprising (i) at least one olefin monomer, or (ii) at least one olefin oligomer, or a combination of (i) and (ii) into a temporary container comprising a container material, which includes an ethylene vinyl acetate copolymer, an ethylene vinyl alcohol copolymer, a polyvinylpyrrolidone, an ethylene vinylpyrrolidone copolymer, a vinylpyrrolidone vinyl acetate copolymer, a polysaccharide or its derivative, or a combination comprising at least one of the foregoing;

sealing the temporary container (11, 21, 31);

allowing the drag reducing agent forming component to polymerize in the sealed temporary container to form a core (12, 22, 32) comprising a polyolefin; and

deactivating the catalyst in the temporary container while the temporary container is sealed,

wherein a largest dimension of the drag reducing agent is greater than 1,000 microns.

13. The method of claim 12, wherein deactivating the catalyst comprises allowing a deactivating agent to diffuse into the temporary container to deactivate the catalyst, the deactivating agent comprising water, an alcohol, hydrogen sulfide, oxygen, or a combination comprising at least one of the foregoing.

14. The method of claim 12, further comprising making an aperture on the temporary container to allow water or oxygen to diffuse into the temporary container.