Gas Barrier Technologies for Plastic Packaging

DESCRIPTION

An American Fortune 500 company seeks cost effective gas barrier technologies that can be applied to plastic bottles, plastic flex bags, and potentially aluminum cans.

BACKGROUND

Plastic food and beverage packaging is convenient and lightweight. However, plastic in general is not effective at keeping oxygen and other gasses from permeating the container. Oxygen has a degrading effect on flavor, color and vitamin content of many food and beverage products, thereby reducing their shelf life.

As a manufacturer of carbonated beverages, the company is challenged with ensuring carbon dioxide (CO2) retention in polyethylene terephthalate (PET) at an affordable cost. The company has conducted extensive research into alternative barrier technologies; however, novel or next generation approaches are required to meet evolving technical requirements. The list below details some of the technologies that the company has explored in the past.

1. Plasma-enhanced chemical vapor deposition (PECVD)
2. Atomic Layer Deposition (ALD)
3. Thermal barrier coatings (TBC)

KEY SUCCESS CRITERIA

The successful technology will:

- Use materials/ingredients characterized as edible and/or safe by an authorized regulatory body.
    - For example: GRAS materials in the US; materials listed as safe to consume by EFSA or by Codex Alimentarius
    - At a minimum must be non-toxic
- Adhere to the base plastic
    - Must be flexible to handle bottle expansion under pressure
    - Must be shock and friction resistant to prevent cracks and scratches
    - Ideally, the uniformity and completeness of the coating could be quickly monitored in-line
- If coating formed packages (bottles or bags), the curing process must be extremely fast so as not to disrupt the process line throughput or leach into/stick to the product.

- If applied prior to forming, must be robust enough to survive the forming process
  - Must be uniform in thickness with no imperfections
  - Preferred for flex bag manufacturing
- The barrier cannot adversely impact the recyclability of the package
- Coating process cannot dramatically impact the cost of the package
- For beverage applications the barrier needs to be as optically clear as possible

NOTE: Individual technologies that utilize only one form of barrier from the list above (i.e. PECVD, ALD, TBC) should be avoided unless the inventor can offer a step-change in the existing technology to dramatically change its cost or performance.

POSSIBLE APPROACHES

- Monolayer barrier coatings are preferred
- Barriers applied on the outside of the package
  - Must be optically clear to not disrupt any graphics
  - Must be durable and robust enough to withstand distribution and handling
- Barrier technologies that can be applied to polypropylene flexible snack bags are also of interest.
  - Applied on the roll to roll film manufacturing process OR in the bag itself as it is formed
- Solutions that provide for enhanced barrier through process changes are also of interest.

APPROACHES NOT OF INTEREST

Individual technologies that utilize only one form of barrier technology from the list above (i.e. PECVD, ALD, TBC) should be avoided unless the inventor can offer a step-change in the existing technology to dramatically change its cost or performance.

Additionally, the following approaches are not of interest:

- Technologies that adversely affect recyclability
- Approaches that require significant cure time
- Approaches that are not safe for human use

PREFERRED COLLABORATION TYPES:

☒Joint Development
☒Contract Research
☒Technology Acquisition
☒Technology Licensing
☒Supply Agreement
☒To Be Negotiated

If you are interested, please respond to:

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