Multilayer Plastic Vial and Syringe Made of Oxygen Absorbing Polymer

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Purpose
Recently, sales of bio drugs have been growing instead of the existing small-molecule drugs. Bio drugs are basically sensitive for oxygen, so glass vials or syringes with high oxygen barrier are often used for them. Glass is well-known as a good material for its high oxygen and water vapor barrier and used for a variety of parenteral drug containers, but its breakage, heavy weight, disposability, protein adsorption, pH shift and others are often pointed out. On the other hand, as an alternative material to glass, polyolefin such as COP and COC, which is known for its high water vapor barrier and low protein adsorption, is used for parenteral drug containers, but they don’t have oxygen barrier enough. Under these circumstances, Mitsubishi Gas Chemical (MGC) developed multilayer plastic vial and syringe having glass-like oxygen and water vapor barrier.

Methods
MGC has developed a new type of transparent oxygen absorbing polymer that has extremely low extractables, maintains high strength and doesn’t emit any odor after absorbing oxygen. In addition, MGC also has developed multilayer plastic vial and syringe that have the oxygen absorbing function in the middle layer. Oxygen absorbing layer absorbs oxygen permeating from outside of container and can keep oxygen permeability at zero.

Results
The multilayer plastic container has almost zero oxygen-permeability like glass and the highest water vapor barrier in the existing plastic containers. The amount of total organic carbon (TOC) extracted from the multilayer plastic container is very similar to that extracted from the COP containers. In addition, the multilayer plastic container has lower protein adsorption and is much lighter than glass container, and pH level of drug in the multilayer container doesn’t change.

Conclusion
MGC has successfully developed multilayer plastic vials and syringes with glass-like barriers. MGC calls them OXY-CAP™ Vial and Syringe and recommends using them for oxygen-sensitive bio drugs, vaccines, diagnostics and others.