[Claim 1]

A battery separator comprising at least a polyolefin porous membrane and a modified porous layer, the polyolefin porous membrane having protrusions made of a polyolefin interspersed randomly on at least one surface at a density of not less than 3 protrusions/cm^2 and not greater than 200 protrusions/cm^2, the protrusions satisfying 5 $\mu m \leq W \leq 50$ μm (W being a size of the protrusion) and 0.5 $\mu m \leq H \leq 3.0$ μm (H being a height of the protrusion), and the modified porous layer containing a fluorine-based resin and inorganic particles imparting or improving adhesion with an electrode being laminated on a surface of the polyolefin porous membrane, the surface having the protrusions; a content of the inorganic particles relative to a total of the fluorine-based resin and the inorganic particles of the modified porous layer being not less than 40 wt.% and less than 80 wt.%, the size of a protrusion indicating a distance between inflection points at each side of a skirt of the protrusion in a cross-sectional profile image of the protrusion obtained via a confocal microscope.

[Claim 2]

The battery separator according to claim 1, wherein a thickness of the polyolefin porous membrane is not greater than 25 μm.

[Claim 3]

The battery separator according to claim 1 or 2, wherein the inorganic particles include at least one type selected from the group consisting of calcium carbonate, alumina, titania, barium sulfate, and boehmite.

[Claim 4]

The battery separator according to any one of claims 1 to 3, wherein the battery separator is used as a lithium ion rechargeable battery separator.

[Claim 5]

A method of manufacturing the battery separator described in any one of claims 1 to 4, the method comprising the steps of:

(a) preparing a polyethylene resin solution by adding a forming solvent to a polyethylene resin and then melt-kneading the solution;

(b) forming a gel-like molded product by extruding the polyethylene resin solution through a die and cooling the extrudate with a cooling roller having a surface with the forming solvent thereon removed;

(c) stretching the gel-like molded product in a machine direction and in a width direction to obtain a stretched and molded material;

(d) extracting and removing the forming solvent from the stretched and molded material, followed by drying to obtain a porous molded material;

(e) treating the porous molded material by heat to obtain a polyolefin porous membrane; and

(f) forming a laminated film on a surface of the polyolefin porous membrane, the surface being in contact with the cooling roller, using a coating solution containing a fluorine-based resin, inorganic particles, and a solvent capable of dissolving or dispersing the fluorine-based resin, and drying the laminated film.

[Claim 6]

The method of manufacturing a battery separator according to claim 5, wherein a means to remove the forming solvent in step (b) is a doctor blade made of polyethylene.