CLAIMS

WHAT IS CLAIMED IS:

1. A coated separator, comprising:

a membrane;

a ceramic layer coated on one or two sides of the membrane; and

an adhesive coating layer coated on the ceramic layer;

wherein the adhesive coating layer comprises an adhesive polymer resin and a photoinitiator, and the adhesive polymer resin comprises one or a combination of at least two of a polyvinylidene fluoride (PVDF)-based adhesive polymer resin, a polyimide (PI), a polyetherimide (PEI), and polymethylmethacrylate (PMMA);

wherein a weight proportion of the photoinitiator in the adhesive coating layer is 0.05 wt% to 0.3 wt%.

2. The coated separator according to claim 1, wherein the PVDF-based adhesive polymer resin comprises one or a combination of at least two of a PVDF homopolymer, poly(vinylidene fluoride-co-hexafluoropropylene) (PVDF-HFP), poly(vinylidene fluoride-tetrafluoroethylene-propylene) (PVDF-TFE-P), and poly(vinylidene fluoride-trifluoroethylene-chlorotrifluoroethylene) (PVDF-TFE-CTFE).

3. The coated separator according to claim 1, wherein the photoinitiator comprises one or a combination of two of isopropylthioxanthone (ITX) and benzophenone.

4. The coated separator according to claim 1, wherein the adhesive coating layer is distributed on the ceramic layer at intervals.

5. The coated separator according to claim 4, wherein a ratio of an area of the adhesive coating layer to an area of the intervals is 1:1 to 5:1, and the intervals each refer to a gap between two adjacent adhesive coating layers.

6. The coated separator according to claim 1, wherein the ceramic layer comprises an inorganic material, and the inorganic material is one or a combination of at least two of silica, alumina, boehmite, titanium oxide, magnesium oxide, or a nanofiber.

7. The coated separator according to claim 1, wherein the coated separator has a bonding strength of higher than or equal to 15 gf/25 mm, a breakage temperature of higher than 180°C, and a surface resistance of 1.4 $\Omega.cm^2$ or less.

8. A preparation method of the coated separator according to any one of claims 1 to 7, comprising the following steps:

(1) providing the membrane, and coating the ceramic layer on one or two sides of the membrane;

(2) preparation of a coating slurry: adding no more than 5 wt% to 30 wt% of the adhesive polymer resin and 0.08 wt% to 1.0 wt% of the photoinitiator to a solvent, and allowing full dissolution to obtain the coating slurry;

(3) coating: coating the coating slurry on the ceramic layer to form the adhesive coating layer on the ceramic layer to obtain a coated membrane; and

(4) ultraviolet (UV) crosslinking: irradiating the coated membrane under UV light to initiate a crosslinking reaction to obtain the coated separator.

9. The preparation method of the coated separator according to claim 8, wherein in the step (3), the operation of coating refers to continuous full coating, wherein the coating slurry is continuously coated on an entire surface of the ceramic layer to form the adhesive coating layer on the entire surface of the ceramic layer.

10. The preparation method of the coated separator according to claim 8, wherein in the step (3), the operation of coating refers to discontinuous coating, wherein the coating slurry is discontinuously coated on the ceramic layer at intervals to form the adhesive coating layer discontinuously distributed on the ceramic layer.

11. The preparation method of the coated separator according to claim 8, wherein the UV light has a wavelength of 210 nm to 420 nm and an intensity of 50 mj/cm^2 or more, and the UV crosslinking is conducted for 0.001 s to 10 s.

12. A battery, comprising a coated separator, a positive electrode, a negative electrode, and an electrolyte, wherein the coated separator is the coated separator according to any one of claims 1 to 7.