CLAIMS

1. A magnetic disk glass substrate for use in a magnetic disk to be mounted to a hard disk drive having a DFH head, wherein an arithmetic mean roughness (Ra) of a main surface of the glass substrate measured using an atomic force microscope with a resolution of 256×256 pixels in a 2μm × 2μm square is 0.12nm or less and, among defects detected to have a size of 0.1μm or more and 0.3μm or less upon irradiating light with a wavelength of 405nm onto the glass substrate with a spot size of 5μm and detecting scattered light from the glass substrate, the number of the defects fixed to the glass substrate is 1 or less per 24cm^2, the defects remaining without moving on the surface of the magnetic disk glass substrate before and after cleaning under a condition of immersion for 200 seconds in a dilute sulfuric acid solution adjusted to pH4, the glass substrate being an isotropic substrate, a ratio (Ra/Rv) of the arithmetic mean roughness (Ra) to a maximum valley depth (Rv) on the main surface of the glass substrate being 0.15 or more.

2. The magnetic disk glass substrate according to claim 1, wherein the glass substrate has a disk shape with a hole at a center thereof and, assuming that a distance from the center to an outermost periphery is 100%, a difference (Ra_O-Ra_I) between an arithmetic mean roughness (Ra_O) of the main surface in a range of 80% or more and 90% or less from the center and an arithmetic mean roughness (Ra_I) of the main surface in a range of 10% or more and 20% or less from the center is 0.01nm or less.

3. The magnetic disk glass substrate according to claim 1 or 2 wherein the glass substrate has the main surface and an end face,

the main surface and the end face each have a compressive stress layer and

the compressive stress layer of the main surface has a depth which is shallower than that of the compressive stress layer of the end face.

4. A magnetic disk, wherein at least a magnetic layer is formed on the magnetic disk glass substrate according to any of claims 1 to 3.

5. The magnetic disk according to claim 4, wherein the magnetic disk is a patterned medium in which at least adjacent recording tracks are magnetically isolated from each other.

6. A magnetic disk glass substrate for use in a magnetic disk to be mounted to a hard disk drive having a DFH head, wherein an arithmetic mean roughness (Ra) of a main surface of the glass substrate measured using an atomic force microscope with a resolution of 256×256 pixels in a 2μm × 2μm square is 0.12nm or less and the number of concave defects detected to have a size of 0.1μm or more and 0.6μm or less in plan view and a depth of 0.5nm or more and 2nm or less is less than 10 per 24cm^2, the defects each being detected using a shift in wavelength between incident light and reflected light upon irradiating and scanning helium neon laser light with a wavelength of 632nm on the main surface of the glass substrate, the glass substrate being an isotropic substrate, a ratio (Ra/Rv) of the arithmetic mean roughness (Ra) to a maximum valley depth (Rv) on the main surface of the glass substrate being 0.15 or more.

7. The magnetic disk glass substrate according to claim 6, wherein the glass substrate has a disk shape with a hole at a center thereof and, assuming that a distance from the center to an outermost periphery is 100%, a difference (Ra_O-Ra_I) between an arithmetic mean roughness (Ra_O) of the main surface in a

range of 80% or more and 90% or less from the center and an arithmetic mean roughness (Ra_I) of the main surface in a range of 10% or more and 20% or less from the center is 0.01nm or less.

8. The magnetic disk glass substrate according to claim 6 or 7, wherein the glass substrate has the main surface and an end face,

the main surface and the end face each have a compressive stress layer, and

the compressive stress layer of the main surface has a depth which is shallower than that of the compressive stress layer of the end face.

9. A magnetic disk, wherein at least a magnetic layer is formed on the magnetic disk glass substrate according to any of claims 6 to 8.

10. The magnetic disk according to claim 9, wherein the magnetic disk is a patterned medium in which at least adjacent recording tracks are magnetically isolated from each other.

11. A magnetic disk glass substrate manufacturing method comprising:

a polishing step of polishing a main surface of a glass substrate using a polishing liquid containing an additive; and

a cleaning step of cleaning the glass substrate polished, using a cleaning liquid containing the additive.

12. The magnetic disk glass substrate manufacturing method according to claim 11, wherein the additive contains at least one of carboxylic acid, polyvalent amine, amino acid, aminopolycarboxylic aid, phosphonic acid, phosphinic acid, phosphoric acid, pyrophosphoric acid, tripolyphosphoric acid, amino trimethylene phosphonic acid, and salts thereof.

13. The magnetic disk glass substrate manufacturing method according to claim 12, wherein the additive is contained in the polishing liquid in

a range of 0.01wt% or more and 10.0wt% or less and is contained in the cleaning liquid in a range of 0.01wt% or more and 5.0wt% or less.

14. The magnetic disk glass substrate manufacturing method according to claim 13, wherein the additive is contained in the polishing liquid in a range of 0.1wt% or more and 5.0wt% or less and is contained in the cleaning liquid in a range of 0.1wt% or more and 3.0wt% or less.

CLAIMS

1. A magnetic disk glass substrate for use in a magnetic disk to be mounted to a hard disk drive having a DFH head, wherein an arithmetic mean roughness (Ra) of a main surface of the glass substrate measured using an atomic force microscope with a resolution of 256×256 pixels in a 2μm × 2μm square is 0.12nm or less and, among defects detected to have a size of 0.1μm or more and 0.3μm or less upon irradiating light with a wavelength of 405nm onto the glass substrate with a spot size of 5μm and detecting scattered light from the glass substrate, the number of the defects fixed to the glass substrate is 1 or less per 24cm^2, the defects remaining without moving on the surface of the magnetic disk glass substrate before and after cleaning under a condition of immersion for 200 seconds in a dilute sulfuric acid solution adjusted to pH4, the glass substrate being an isotropic substrate, a ratio (Ra/Rv) of the arithmetic mean roughness (Ra) to a maximum valley depth (Rv) on the main surface of the glass substrate being 0.15 or more.

2. The magnetic disk glass substrate according to claim 1, wherein the glass substrate has a disk shape with a hole at a center thereof and, assuming that a distance from the center to an outermost periphery is 100%, a difference (Ra_O-Ra_I) between an arithmetic mean roughness (Ra_O) of the main surface in a range of 80% or more and 90% or less from the center and an arithmetic mean roughness (Ra_I) of the main surface in a range of 10% or more and 20% or less from the center is 0.01nm or less.

3. The magnetic disk glass substrate according to claim 1 or 2 wherein the glass substrate has the main surface and an end face,

the main surface and the end face each have a compressive stress layer, and

the compressive stress layer of the main surface has a depth which is shallower than that of the compressive stress layer of the end face.

4. A magnetic disk, wherein at least a magnetic layer is formed on the magnetic disk glass substrate according to any of claims 1 to 3.

5. The magnetic disk according to claim 4, wherein the magnetic disk is a patterned medium in which at least adjacent recording tracks are magnetically isolated from each other.

6. A magnetic disk glass substrate for use in a magnetic disk to be mounted to a hard disk drive having a DFH head, wherein an arithmetic mean roughness (Ra) of a main surface of the glass substrate measured using an atomic force microscope with a resolution of 256×256 pixels in a 2μm × 2μm square is 0.12nm or less and the number of concave defects detected to have a size of 0.1μm or more and 0.6μm or less in plan view and a depth of 0.5nm or more and 2nm or less is less than 10 per 24cm^2, the defects each being detected using a shift in wavelength between incident light and reflected light upon irradiating and scanning helium neon laser light with a wavelength of 632nm on the main surface of the glass substrate, the glass substrate being an isotropic substrate, a ratio (Ra/Rv) of the arithmetic mean roughness (Ra) to a maximum valley depth (Rv) on the main surface of the glass substrate being 0.15 or more.

7. The magnetic disk glass substrate according to claim 6, wherein the glass substrate has a disk shape with a hole at a center thereof and, assuming that a distance from the center to an outermost periphery is 100%, a difference (Ra_O-Ra_I) between an arithmetic mean roughness (Ra_O) of the main surface in a

range of 80% or more and 90% or less from the center and an arithmetic mean roughness (Ra_I) of the main surface in a range of 10% or more and 20% or less from the center is 0.01nm or less.

8. The magnetic disk glass substrate according to claim 6 or 7, wherein the glass substrate has the main surface and an end face,

the main surface and the end face each have a compressive stress layer, and

the compressive stress layer of the main surface has a depth which is shallower than that of the compressive stress layer of the end face.

9. A magnetic disk, wherein at least a magnetic layer is formed on the magnetic disk glass substrate according to any of claims 6 to 8.

10. The magnetic disk according to claim 9, wherein the magnetic disk is a patterned medium in which at least adjacent recording tracks are magnetically isolated from each other.