high-energy radiation, the mask undergoes significant pattern size variation degradation by irradiation of high-energy radiation. Then the service lifetime of the photomask is shorter than the requirement.

When a photomask blank is processed into a photomask, sometimes the light-shielding film material is not removed as designed, with such undesired residues becoming defects known as "black defects." Since the photomask is prepared by the time-consuming lithography process, it is desirable that if black defects are formed, the photomask be repaired so that it may be used again.

As the effective technique of removing black defects by local etching of a silicon base material film, Patent Document 7 discloses electron beam defect correction using fluorine. However, many optical films (e.g., halftone phase shift films and light-shielding films) made of transition metal/silicon base materials having a low transition metal content are difficult to correct black defects by such a technique. In the attempt to correct defects on mask pattern by directing a beam of high-energy radiation in a fluorine-containing gas atmosphere to generate fluorine radicals for thereby etching away black defects, often a sufficient etching selectivity ratio is not available between the film and the silicon oxide substrate. Thus the attempt to strip off black defects causes the substrate to be etched at the same time.

~~An object~~Embodiments of the invention ~~is~~ seek to provide a photomask, a photomask blank therefor, and a light pattern exposure method using the photomask, the photomask having a pattern of optical film which when used in pattern exposure using ArF excimer laser light or analogous light having high energy and short wavelength as compared with the conventional light, and even after a large cumulative dose of irradiation energy,