Summary

According to an aspect, there is provided a monofocal ophthalmic lens having an optical power, comprising: an optical filter operable to filter out at least visible light having a wavelength less than 450 nm; a first monofocal diffractive structure adapted to produce a focus corresponding to the optical power for visible light in a first wavelength range above 550 nm and to reduce longitudinal chromatic aberration to less than one diopter for incoming visible light in the first wavelength range; a second monofocal diffractive structure outside the first diffractive structure in a radial direction and adapted to produce a focus for visible light corresponding to the optical power in a second wavelength range between 450 nm and 550 nm and to reduce longitudinal chromatic aberration for incoming visible light in the second wavelength range to less than one diopter while allowing longitudinal chromatic aberration in the first wavelength range in an amount greater than that in the first monofocal diffractive structure.

According to another aspect, there is provided a method of manufacturing a monofocal ophthalmic lens having an optical power, comprising: determining a first profile for a first monofocal diffractive structure adapted to produce a focus corresponding to the optical power for visible light in a first wavelength range above 550 nm and to reduce longitudinal chromatic aberration to less than one diopter for incoming visible light in the first wavelength range; determining a second profile for a second monofocal diffractive structure outside the first diffractive structure in a radial direction and adapted to produce a focus for visible light corresponding to the optical power in a second wavelength range between 450 nm and 550 nm and to reduce longitudinal chromatic aberration for incoming visible light in the second wavelength range to less than one diopter while allowing longitudinal chromatic aberration in the first wavelength range in an amount greater than that in the first monofocal diffractive structure; forming the monofocal ophthalmic lens with the first profile and the second profile and incorporating an optical filter operable to filter out at least visible light having a wavelength less than 450 nm.

In a particular embodiment of the present invention, an ophthalmic lens includes an optical filter operable to filter out at least visible light having a wavelength less than 450 nm. The lens also includes a first diffractive structure adapted to produce a focus for visible light in a first wavelength range above 550 nm and to reduce longitudinal chromatic aberration to less than one diopter for incoming visible light in the first wavelength range. The lens also includes a second diffractive structure outside the first diffractive structure in a radial direction and adapted to produce a focus for visible light in a second wavelength range between 450 nm and 550 nm. The second diffractive structure is also adapted to reduce longitudinal chromatic aberration for incoming visible light in the second wavelength range to less than one diopter while allowing longitudinal chromatic aberration in the first wavelength range in an amount greater than the first diffractive structure.

In another embodiment, a method of manufacturing an IOL includes determining a first profile for a first diffractive structure adapted to produce a focus for visible light in a first wavelength range above 550 nm and to reduce longitudinal chromatic aberration to less than one diopter for incoming visible light in the first wavelength range. The method also includes determining a second profile for a second diffractive structure outside the first diffractive structure in a radial direction and adapted to produce a focus for visible light in a second wavelength range between 450 nm and 550 nm. The second diffractive structure also reduces longitudinal chromatic aberration for incoming visible light in the second wavelength range to less than one diopter while allowing longitudinal chromatic aberration in the first wavelength range in an amount greater than the first diffractive structure. The method then includes forming an ophthalmic lens with the first profile and the second profile and incorporating an optical filter operable to filter out at least visible light having a wavelength less than 450 nm.

In another embodiment, a method of manufacturing an IOL includes determining an optical filter operable to filter out at least light having a wavelength below 450 nm. The method also includes determining a first profile for at least one central diffractive structure having a radius within a selected pupil size for photopic