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## **Non-lead light-weight glasses for eye dose reduction of angiography radiation workers**

Currently, the development of light-weight, nontoxic, lead-free radiation shields containing micro or nanoparticles has attracted the attention of different investigators (1, 2). Lead Glass is typically used as a transparent protective barrier in making control windows for different medical imaging modalities, like mammography, diagnostic radiology, CT scan, fluoroscopy, and angiography (3). Such transparent shields can be used for making eyeglasses for the reduction of eye dose (4). However, the heaviness and toxicity of the lead have always been a major concern (5). In this study, light-weight lead-free eyeglasses were simulated using MCNP6 Monte Carlo code. For validation of the simulation, the attenuation coefficient of the simulated shields was compared with the XCOM data. The attenuation properties of transparent shields containing 25% PbO, 20%, 30%, and 40% Barium Carbonate were compared with simulated. Usually, eyeglasses are 0.5 to 0.75mm lead equivalent. The results of the simulation indicate that the eyeglasses, containing 40% Barium carbonate, with the same attenuation for 80kVp, are 26% lower than the common lead glasses containing 25% PbO. The results are because of the fact that the K-edge of Barium is 37.4 keV, after which the radiation flux is reduced significantly. Therefore light-weight non-toxic silicate glasses can be made, with high attenuation for diagnostic X-ray.

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