

**Natural radioactivity of some Egyptian materials used in glasses manufacturing and glass ceramics**

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**Abstract:** (527 Views)

**Background:** The new glasses from harmful environmental waste such as cement dust; limestone phosphate, sand and borax (Genkare) were manufactured. Investigation of the radioactivity present in these materials (Phosphate rock, cement dust, limestone, sand and borax) enables one to assess any possible radiological hazard to humankind by such materials. **Materials and Methods:** Fifteen samples were collected from five locations. Activity measurements have been performed by gamma-ray spectrometer, employing a high-resolution scintillation detector NaI (TI) crystal 3 ×3 inch. In addition, the radiological hazards were calculated for the investigated samples. **Results:** The average values of activity ranged from  $28 \pm 2$  to  $163 \pm 12$ ,  $2.8 \pm 0.7$  to  $40 \pm 3$  and from  $49 \pm 4$  to  $1337 \pm 74$  Bq kg<sup>-1</sup> for <sup>226</sup>R, <sup>232</sup>Th and <sup>40</sup>K, respectively. The values of absorbed dose rates, radium equivalent activities and annual effective dose due to <sup>226</sup>Ra, <sup>232</sup>Th and <sup>40</sup>K respectively, are ranged from 22.05 to 101.59 nGy h<sup>-1</sup>, 45.90 to 224.22 Bq kg<sup>-1</sup> and 27.04 to 124.59 μSv y<sup>-1</sup>. In addition, the values of external hazard index, internal hazard index and gamma index have been calculated. **Conclusion:** According to the obtained results, all materials would not present a significant radiological hazard except phosphate. The results of the study could serve as important baseline radiometric data for future epidemiological studies and monitoring initiatives.

**Keywords:** Natural radioactivity, glass ceramics radiological hazards, phosphate rock, cement dust, limestone, sand, borax and glasses.