

KCl:Eu²⁺結晶の熱蛍光による太陽光中の紫外線量計測

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UV light measurements of the sunlight using thermoluminescence of KCl : Eu²⁺

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Allocation Type

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Research Field

Applied materials

Research Institution

Kanazawa University

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Research Abstract

UV light irradiation followed by heating a single crystal of KCl doped with divalent europium ions was shown to produce thermoluminescence (TL) glow peaks which may provide a unique method for UV dosimetry of the sunlight. In this work several experimental conditions were investigated to measure the UV light and the results are summarized as follows.

- (1) The UV light in the range from 200 to 320nm was shown to be effective for measurements of the TL glow peaks. The most effective UV light was found at the wavelength around 250nm corresponding to $Eu^{2+} [^8S_{7/2}(4f^7) \text{ to } ^2G_{7/2}(4f^65d)]$ transition.
- (2) The TL intensity which was estimated with identical UV light irradiation increased with temperature of the pre-heat treatment of the crystal. The increment as high as 10 times was obtained for the crystal treated at 927K in argon gas atmosphere for 30min compared with untreated one.
- (3) The TL intensity was also found to depend on the europium concentration in the crystal and the optimum concentration was around 100ppm.
- (4) Preliminary measurement of the glow peak after irradiation of the sunlight was successful with the crystal doped with 100ppm of europium, though the intensity was so weak. The sunlight irradiation was directly carried out onto the crystal placed on the roof of the building of our laboratory in Kanazawa.

Research Products (8 results)

All Other

All Publications (8 results)

[Publications] 南戸秀仁、中村昭一、竹内望他3名: "EuドーブKCl蛍光体の光刺激ルミネッセンス現象を利用したX線および紫外線イメージセンサー" 研究会「放射線検出器とその応用(1993)論文集」. 90-93 (1993) ▼

[Publications] H.Nanto,N.Takeuchi et al.: "Optically Stimulated Luminescence in KCl:Eu Single Crystals" Rad.Protection Dosimetry. 47. 281-284 (1993) ▼

[Publications] Y.Fukuda,N.Takeuchi et al.: "Thermoluminescence in Calcium Phosphate Doped with CeO₂ and Tm₂O₃" Rad.Protection Dosimetry. 47. 201-204 (1993) ▼

[Publications] Y.Fukuda,N.Takeuchi et al.: "Thermoluminescence of Hydroxyapatite Doped with Copper" Rad.Protection Dosimetry. 47. 205-208 (1993) ▼

[Publications] H.Nanto, N.Takeuchi et al.: "X-Ray or UV-Ray Imaging Sensor Utilizing Optically Stimulated Luminescence Phenomenon in Eu-doped KCl Phosphors" Proceedings of the Seventh Workshop on Radiation Detectors and Their Uses.90-93 (1993) ▼

[Publications] H.Nanto, N.Takeuchi et al.: "Optically Stimulated Luminescence in KCl : Eu Single Crystals" Rad.Protection Dosimetry. 47. 281-284 (1993) ▼

[Publications] Y.Fukuda, N.Takeuchi et al.: "Thermoluminescence in Calcium Phosphate Doped with CeO₂ and Tm₂O₃" Rad.Protection Dosimetry. 47. 201-204 (1993) ▼

[Publications] Y.Fukuda, N.Takeuchi et al.: "Thermoluminescence of Hydroxyapatite Doped with Copper" Rad.Protection Dosimetry. 47. 205-208 (1993) ▼

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