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5P26 - Repetitive Triboluminescence X-Ray Source by Peeling Tapes

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Triboluminescence is a luminous phenomenon resulted from friction; for example, peeling scotch tape, breaking rock sugar with a hammer, peeling mica and so on. Triboluminescence is well known over 50 years but in 2008 UCLA group reported the radiation of x-ray region by triboluminescence in vacuum for the first time(1). UCLA group made an automatic machine which peels scotch tape. With a view to practical application of triboluminescence to roentgen diagnosis we made an automatic peeling machine similar to that of UCLA group. An x-ray tube for conventional roentgen diagnosis needs a high voltage power supply. In contrast, triboluminescence does not need it. So it is very useful for roentgen diagnosis to replace a conventional x-ray tube with triboluminescence. Thus far, we have attempted to confirm the x-ray generation from triboluminescence using a filtered phosphor screen when the parameters such as the followings are changed; peeling speed, atmospheric pressure, variety of scotch tape, emission angle etc. Then in a similar way we have also attempted to measure x-ray dose from triboluminescence using a potable dosemeter. It was found that the x-ray generation has a directional property. Because the method to peel scotch tapes does not enable to operate continuously, we have made a novel machine enabling continuous operation by peeling tapes. In this conference, we have reported a new-type triboluminescence equipment and showed its characteristics when the following conditions are changed; varieties of tapes, operating velocity, radiation direction, pressure and so on.

(1) Correlation between nanosecond X-ray flashes and stick-slip friction in peeling tape: C.G.Camara, J.V.Escobar, J.R.Hird and S.J.Putterman, nature Vol.455 (23 Oct 2008) pp.1089-1092

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