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The development of efficient X-ray conversion material for digital mammography

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A variety of direct X-ray conversion materials have been studied to develop digital mammography. Since direct conversion materials, such as HgI₂, PbI₂, and PbO have high X-ray conversion efficiency comparing to indirect X-ray conversion materials like CsI(Tl) and NaI, direct conversion materials are suitable for digital mammography which requires high spatial resolution at low exposure rate. In this study, a new concept of active matrix flat panel detector for mammography is introduced to fulfill these requirements and reduce physical pains for patient occurred when patients' breast are pressed. This system consists of miniature X-ray tube based on subminiature thermal electron, AMFPI technology based detector, and a body including automatic position and system control devices. Electrical results from fundamental pixel signal performance of direct X-ray conversion materials on AMFPI are shown and play a important role in verify the functioning of mammographic design. Also, the part of digital X-ray conversion detector can be bent, which serve to reduce patients' breast pain. The results of electrical performances of direct X-ray conversion material, PbO, demonstrate the potential for high efficiency of mammographic systems based on flexible digital mammography. The obtained mammographic images from this system are evaluated and compared to images from existing mammographic system.

Primary author: Mr OH, Kyung-min (Department of Biomedical Engineering, Inje University, Gimhae 621-749, Republic of Korea)

Co-author: NAM, Sang-hee (Department of Biomedical Engineering & Medical Imaging Research Center, Inje University, Gimhae 621-749, Republic of Korea)

Presenter: Mr OH, Kyung-min (Department of Biomedical Engineering, Inje University, Gimhae 621-749, Republic of Korea)

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