Session 8 - Optoelectronics, Displays, and Imagers - Circuitry for Optoelectronics
Monday, December 9, 1:30 p.m.
Continental Ballroom 7-9
Co-Chairs: B. Leo Kwak, Applied Materials
L. Zhou, BOE Corp.

1:35 PM **8.1** 14nm FinFET Process Technology Platform for Over 100M Pixel Density and Ultra Low Power 3D Stack CMOS Image Sensor
Donghee Yu, Choongjae Lee, Myoungkyu Park, Donghee Yu, Choong jae Lee, Myounkyu Park, Junghwan Park, Seungju Hwang, Joonhyung Lee, Sunghun Yu, Hyunjung Shin, ByoungHo Kim, Jong-Won Choi, Sangil Jung, Minho Kwon, Il-Seon Ha, Chaesung Kim, Sanghyun Cho, Seunghyun Lim, Won-Woong Kim, Moo-Young Kim, Seonghye Park, Ki-Don Lee, Rakesh Ranjan, Shigenobu Maeda, and Gitae Jeong, Samsung Electronics Co., Ltd.

CMOS Image Sensor(CIS) products need higher voltage device and better analog characteristics than conventional SOC & Logic products. This work presents newly developed 14nm FinFET process with 2.xV high voltage FinFET device characteristics showing excellent analog and low power digital characteristics comparing to 28nm planar process.

2:00 PM **8.2** High Performance Gigahertz Flexible Radio Frequency Transistors with Extreme Bending Conditions
Mengfei Wang, Mengchuan Tian, Zhenfeng Zhang, Li Shengman, Runsheng Wang, Chengru Gu, Xiaoyu Shan, Xiong Xiong, Xuefei Li, Ru Huang, Yanqing Wu, Peking University, Huazhong University of Science and Technology

Ultrathin indium tin oxide RF TFT have been demonstrated for the first time, with record-high extrinsic f_T of 2.1 GHz and f_{max} of 3.7 GHz. The stability of DC and RF performance after bending for 50,000 bending cycles or with 1 mm bending radius are studied without device failure.

2:25 PM **8.3** A Novel Structural Design Serving as a Stress Relief Layer for Flexible LTPS TFTs
Yu-Xuan Wang, Ting-Chang Chang, Shin-Ping Huang, Mao-Chou Tai, Yu-Zhe Zheng, Chia-Chuan Wu, Simon Sze, National Chiao Tung University, National Sun Yat-Sen University

A novel structural design, naming as wing-shape TFTs, is proposed to enhance the performances of flexible LTPS TFTs. By extending the active layer, also serving as a stress relief layer, removes the degradation regions away from the channel. No additional process is needed which leads its potential for commercialization.

2:50 PM *COFFEE BREAK*

3:15 PM **8.4** Self-Aligned Elevated-Metal Metal-Oxide Thin-Film Transistors for Displays and Flexible Electronics
Zhihe Xia, Lei Lu, Jiapeng iI, Hoi-Sing Kwok, Man Wong, The Hong Kong University of Science and Technology, Peking University

Unlike the source/drain regions, formed using extrinsic dopants, of top-gate self-aligned (SA) metal-oxide (MO) thin-film transistors (TFTs), those of presently reported bottom-gate ones are formed using a thermal annealing process, improving TFT scalability. The demonstrated short-channel high-mobility (>20 cm^2/Vs) bottom-gate SA MO TFT is beneficial for displays and flexible electronics.

3:40 PM **8.5** Flexible, Active-Matrix Flat-Panel Image Sensor for Low Dose X-ray Detection Enabled by Integration of Perovskite Photodiode and Oxide Thin Film Transistor

Taoyu Zou, Changdong Chen, Ben Xiang, Ya Wang, Chuan Liu, Shengdong Zhang, Hang Zhou, Peking University, Sun Yat-sen University

An image sensor based on low-cost two-step deposited perovskite photodiode arrays and oxide (IGZO) TFTs are demonstrated for direct and indirect X-ray imaging applications. The system can be fabricated on flexible substrates, and the perovskite photodiode exhibits a significant direct X-ray response, reaching a sensitivity of ~887 $\mu C Gy^{1} cm^{-2}$