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Bio-inspired imager improves sensitivity in near-infrared fluorescence image-guided surgery: supplementary material

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This document provides supplementary information to "Bio-inspired imager improves sensitivity in near-infrared fluorescence image-guided surgery," https://doi.org/10.1364/OPTICA.5.000413. Figures for the imaging sensor block and timing diagram and the microfabrication procedure for the pixelated spectral filters are presented here.

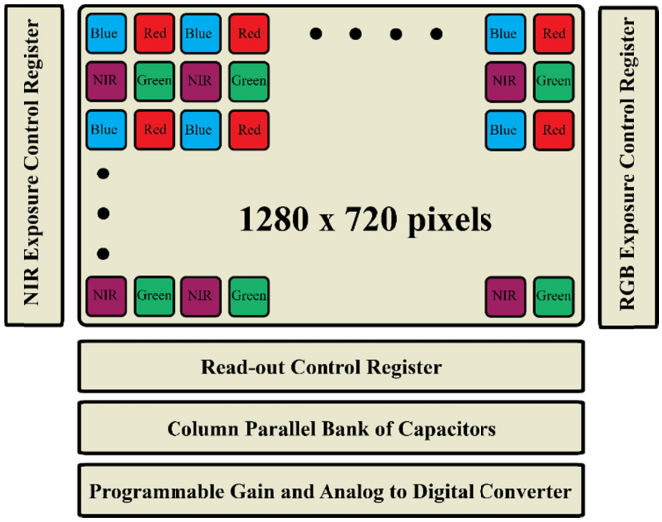

Fig S1. Block diagram of the bio-inspired color-near infrared (NIR) scientific complementary metal-oxide semiconductor imaging sensor. An array of photo detectors and pixelated interference spectral filters are monolithically integrated. The two exposure control registers enable individual control of the times the NIR and red, green, blue photodiodes are collecting photons.

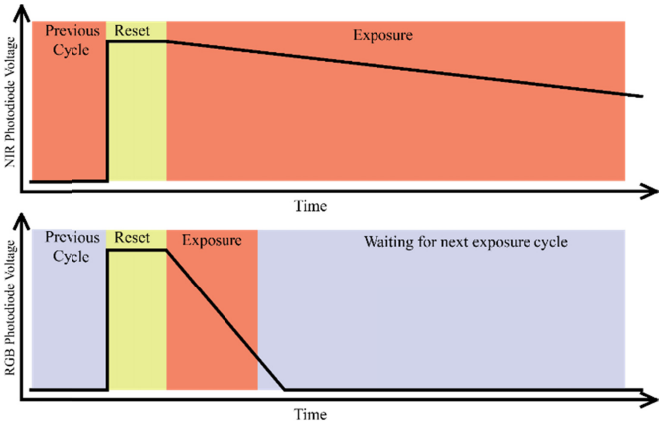

Fig S2. Timing diagram of two neighboring pixels with different spectral filters. Top, Photodiode voltage on the near infrared (NIR) pixel. Bottom, Photodiode voltage on the visible (red, green, blue) pixels. Because of the difference in the photon flux between the NIR fluorescence and reflected visible-spectrum light under surgical light illumination, the exposure time is adjusted accordingly to capture high-SNR and high-contrast images. The photodiode signal is sampled at the end of the exposure time, which is 0.1 ms for the visible spectrum pixel and 40 ms for the NIR pixels.

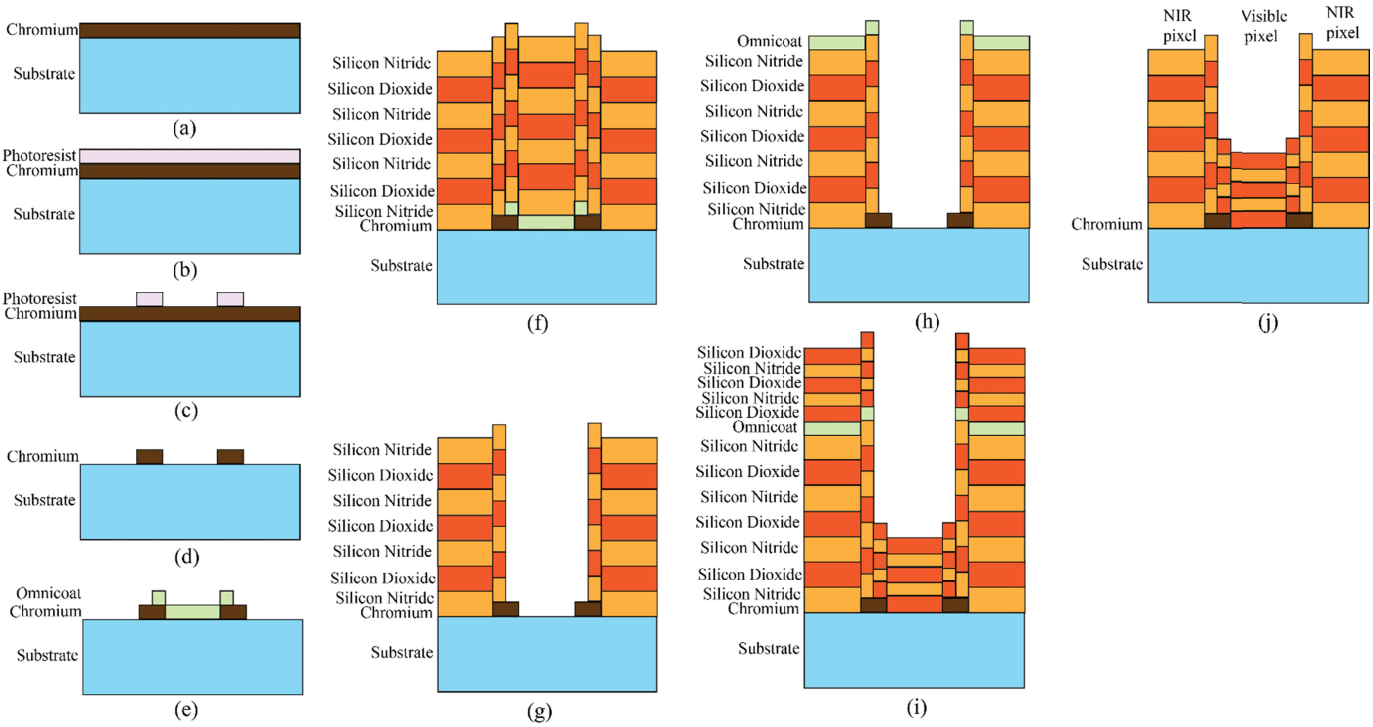

Fig. S3. Microfabrication procedure for fabricating pixelated spectral filters.