Supporting Information

Before decrypting the original intensity data from the raw format images, it is useful to understand how a digital camera sensor works. The sensor is essentially a 2-D light detector array made up of millions of pixels. Each pixel is a micron-sized semiconductor photodiode that generates analog electric signals proportional to the accumulated photons during the exposure. The photodiodes, whether they are the CCD type or CMOS type, can record light intensity but not the colour. This is because each photodiode generates the same amount of electrons when it receives a certain quantity of photons, no matter what the wavelength is. Each pixel is covered by a colour filter to achieve colourful imaging, and a micro lens to enhance light collection efficiency. The most widely-used colour filter set is the Bayer colour filter mosaic, in which each unit contains one red, one blue, and two green pixels arranged in a 2x2 matrix, as shown in the inset of Fig. 2 (a). The design mimics the physiology of the human retina, which is more sensitive to green light than blue and red. The imaging sensor in the Nikon D300 that we used is the CMOS type and has 12.3 million pixels. Each pixel is assigned a 14-bit digital value corresponding to its analog electric signal amplitude, meaning that any value exceeding 16383 (equals to 214-1) will be recorded as 16383.