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## NEUTRAL DENSITY (ND) FILTERS FOR DIGITAL CAMERAS GO INTO MASS PRODUCTION

Sumitomo Metal Mining Co., Ltd. (SMM: Minato-ku, Tokyo/ President: Koichi Fukushima) has completed a production line and launched full-scale mass manufacture of its innovative absorptive film-based neutral density (ND) filters for use in digital still cameras. Until now, the company has been providing customers with sample shipments of the new filters, which were developed in autumn 2005.

The newly completed production equipment keeps manufacturing costs low through adoption of a roll-to-roll configuration, which provides outstanding productivity. Filter shipments have already begun to manufacturers of digital cameras and security cameras, and going forward SMM aims to expand into the cameraphone market as well.

ND filters are optical elements capable of virtually equal reduction of light intensity throughout the visible range (400-800 nm). As the photographic elements of digital cameras – CCDs (charged coupled devices) and CMOS's (complementary metal oxide semiconductors) – have become increasingly sensitive, the need has emerged for light adjustment by ND filter in addition to conventional adjustment of the f-stop. The ND filters available to date have been problematic, however, with respect to price and heat resistance, and there have also been problems concerning their light-reduction capability in the near-infrared range, in cases when security cameras are used for nighttime monitoring.

SMM's ND filters feature a film of proprietary inorganic material formed, by sputtering, on a resin film substrate. They achieve low reflectivity by virtue of their spectral characteristics featuring modest wavelength dependence in both the visible and near-infrared ranges. They are also immune to curvature from ambient changes in temperature or humidity. They have been well received especially because, being a film, they can be flexibly processed into any desired shape, making them ideal for incorporation into digital still cameras.

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