



Application Note

>>>

Figure 1. (Left)

Microstructures of spin-coated 1:4 MDMO-PPV:PCBM thin films from a chlorobenzene solution (7 μm scan size). Courtesy of Dr. Jun Seok Lee and Prof. Changmo Sung, Univ. of Mass., Lowell.

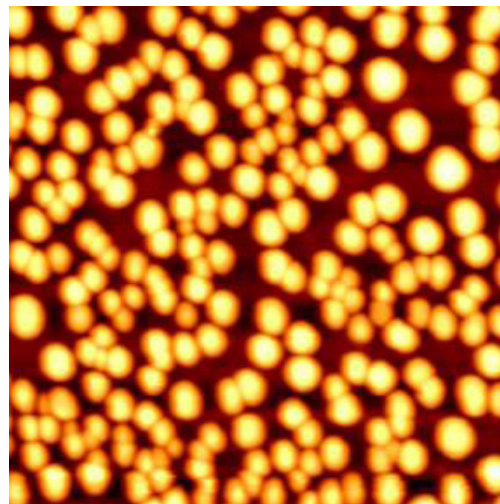
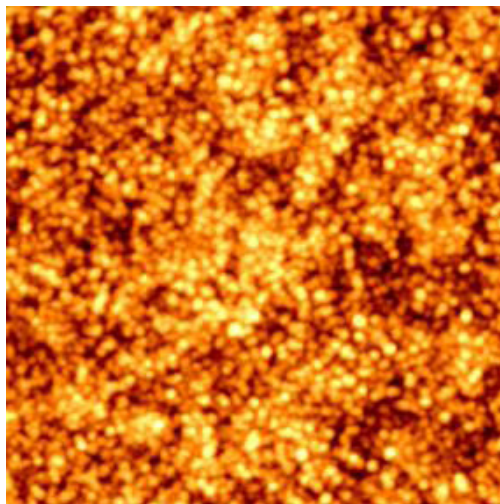
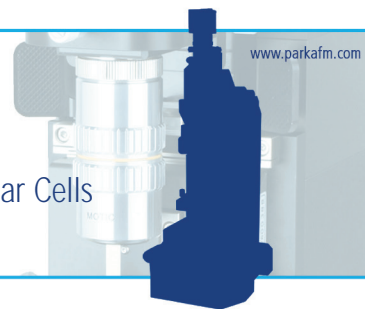
>>>

Figure 2. (Right)

Microstructures of spin-coated 1:4 MDMO-PPV:PCBM thin films from a toluene solution (20 μm scan size).

Characterization of Organic Photovoltaic Cells

Thin Film of MDMO-PPV:PCBM for Organic Solar Cells
Used as an Electro-Optical Device



The electro-optical industry is pursuing the benefits of low weight flexible polymers in the development of solar cells. One of the most reliable photovoltaic structures is the bulk hetero-junction organic solar cell. Current organic optical devices are based on a soluble fullerene derivative (PCBM) as an electron acceptor and an alkoxy-poly (p-phenylenevinylene) derivative (MDMO-PPV) as a donor.

The microstructure of MDMO-PPV:PCBM blends, used in bulk hetero-junction organic solar cells, was studied using the XE-series AFM to image the surface morphology and to disclose the nano-structure of the film. Typical thin films consist of a 1:4 ratio by weight of MDMO-PPV and PCBM, a soluble electron accepting C60 derivative. A two-phase system was observed that consisted of PCBM-rich domains embedded in a matrix consisting of a mixture of MDMO-PPV and PCBM.

We can clearly compare the different PCBM-rich particles between Figures 1 and 2. It has been proven that the change of solvent influences the size of the phase separated PCBM-rich domains. Based on topography information using NC-AFM, the size of particles spin-coated from chlorobenzene was determined to be around 15 nm, in contrast to roughly 100 nm when toluene was used as the solvent.

Park Systems Inc.

3040 Olcott St.
Santa Clara, CA 95054
Toll Free +1-866-979-9330
Phone +1-408-986-1110
Fax +1-408-986-1199
www.parkafm.com

Park Systems Japan Inc.

Nakamaya Bldg. 2F
2-9 Kanda Nishi-cho
Chiyoda-ku
Tokyo 101-0054, Japan
Phone +81-3-3219-1001
Fax +81-3-3219-1002
www.parkafm.co.jp

Park Systems Corp.

KANC 4F
Iui-dong, 906-10
Suwon, Korea 443-270
Phone +82-31-546-6800
Fax +82-31-546-6805
www.parkafm.co.kr