

Optical Properties of C₆₀NW Precipitated in Magnetic Fields

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Recently, a diameter dependence of the resistibility was found for C₆₀ Nano Whisker (C₆₀NW) prepared by liquid-liquid interfacial precipitation (LLIP) method[1]. Thus, the control of the size, especially the decrease in the diameter is considered to be important to obtain high conductivity. The magnetic control of the size[2] and the absorbance peak at 330 nm on the UV-spectrum[3] were reported. In this study, the electron spectrum was measured for C₆₀NW to discuss the mechanism of the magnetic field effects on the size.

An optical cell with bottom of 10 mm square was prepared. Toluene of 0.5 ml as a good solvent saturated with C was put on the cell. Then 1.5 ml of isopropyl alcohol as a poor solvent was stacked gently to form an interface. Two cells were prepared to observe the magnetic field effects. One cell was set at the horizontal homogeneous magnetic field of 9.6 T and the other was set at the absent of the field. The cell was taken out from magnet and set into the UV spectrometer (shimadzu, UV-1700). The optical beam was spotted at the 9 mm height from the bottom which was 4 mm higher than the initial interface position. A typical absorbance curve at 48 h after the start of reaction was shown in Fig. 1. The pattern was agreed with the previous report. The time variations of the absorbance on the 331 nm were plotted in Fig. 2. The difference between the two curves indicated the magnetic field effect. In the case of preparation under the magnetic field of 9.6 T, the absorbance was suppressed compared with the absent of the field because the huge C₆₀NW was precipitated faster according to Stokes low.

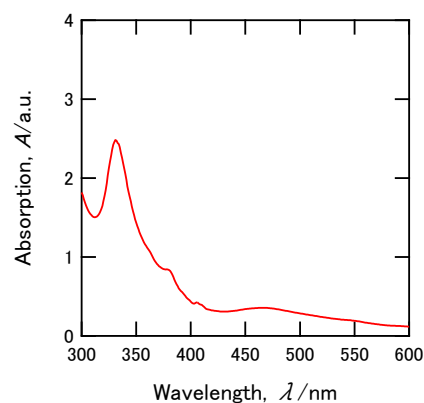


Fig. 1. Absorption spectrum of C₆₀NW in a mixture of toluene and IPA prepared in zero magnetic field.

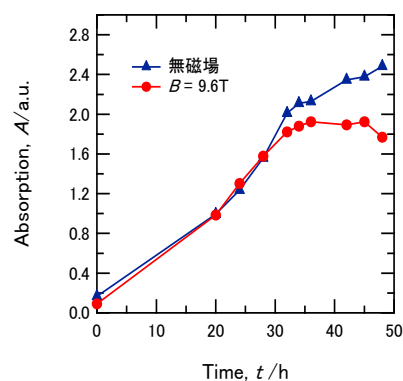


Fig. 2. Absorbance at 331nm of C₆₀NW in a mixture of toluene and IPA.

References

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