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Fabrication and characterization of PEI/TaS2 LbL multilayer films

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PEI/TaS_2 LbL multilayer films were assembled by the layer-by-layer (LbL) technique from TaS_2 nanosheet colloids. The LbL technique is applicable to a wide variety of materials with charges, and is fabricated without special instruments. TaS_2 has a layered structure with negative layer charges. Li was intercalated into TaS_2 to prepare Li_xTaS_2. Exfoliation of TaS_2 was carried out by sonicating Li_xTaS_2 in water. Polyethyleneimine (PEI, MW=75000, 50 wt.% solutions in water) was adopted as cationic polyelectrolyte to assemble LbL multilayer films. The X-ray diffraction patterns shows that the (001) diffraction peak was observed at 9.6° (d=0.92 nm), which means the interlayer of TaS_2 was spread by 0.32 nm. Observed Δc=0.32 nm is almost as same as PEI monolayer. The calculated crystallite size from (001) diffraction peak was 12.2 nm. Since the thickness of one layer of the PEI/TaS_2 LbL multilayer film is about 1 nm, 12 nm is just equal to the LbL repeated times. The electrical characterization of PEI/TaS_2 LbL multilayer film will be discussed in details. .

Speaker Biography

M Irie is graduated from Osaka Electro-Communication University in 2014. She is a graduate student of Osaka Electro-Communication University.

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