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Solvent-Dependent Thermoelectric Performance of PC₇₀BM

© Mina Rastegaralam¹, Mitra Rastegaralam²

¹ Department of Electrical and Computer Engineering,
Inter-University Semiconductor Research Center, Seoul National University,
Seoul 08826, South Korea

² Lar Consulting Engineers Company, NO.30, Sharifi Avenue, Vanak Square,
1969944311, Tehran, Iran

E-mail: minarastegaralam@gmail.com

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The investigation of the solvent-dependent thermoelectric properties of [6,6]-Phenyl-C71 butyric acid methyl ester, commonly known as PC₇₀BM, is reported. This work shows how using different solvents leads to obtain different values of thermoelectric power factor and figure of merit for PC₇₀BM. Samples were prepared from solutions of PC₇₀BM in five different solvents: chlorobenzene (CB), 1,2-dichlorobenzene (DCB), 1,2,4-trichlorobenzene (TCB), chloroform (CF), and toluene (TO), and their thermoelectric properties were determined by measuring electrical conductivity, Seebeck coefficient, and mobility. By using polar solvents with high boiling points, such as TCB, the value of mobility increased by a factor of 23, electrical conductivity improved by a factor of 13, and enhancement in the negative Seebeck coefficient value from -405 to $-460 \mu\text{V/K}$ was observed.

Keywords: electrical conductivity, Seebeck coefficient, power factor, PC₇₀BM.