

ANISOTROPIC MORPHOLOGIES AND PROPERTIES IN PERFLUOROSULFONATE IONOMER-BASED MATERIALS

Jong Keun Park

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State
University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
in
Macromolecular Science and Engineering

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December 09, 2009
Blacksburg, Virginia

Keywords: perfluorosulfonate ionomers, Nafion[®], anisotropic morphology,
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electroactive polymer, ionic polymer-metal composite (IPMC)

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Jong Keun Park

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Keywords: perfluorosulfonate ionomers, Nafion[®], anisotropic morphology,
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Jong Keun Park

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State
University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
in
Macromolecular Science and Engineering

Robert B. Moore, chairman
Timothy E. Long
Judy S. Riffle
Kenneth A. Mauritz
S. Richard Turner

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December 09, 2009
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Jong Keun Park

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State
University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
in
Macromolecular Science and Engineering

Robert B. Moore, chairman
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December 09, 2009
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Keywords: perfluorosulfonate ionomers, Nafion[®], anisotropic morphology,
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ANISOTROPIC MORPHOLOGIES AND PROPERTIES IN PERFLUOROSULFONATE IONOMER-BASED MATERIALS

Jong Keun Park

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State
University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
in
Macromolecular Science and Engineering

Robert B. Moore, chairman
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Robert B. Moore, chairman
Timothy E. Long
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S. Richard Turner

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ANISOTROPIC MORPHOLOGIES AND PROPERTIES IN PERFLUOROSULFONATE IONOMER-BASED MATERIALS

Jong Keun Park

Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State
University in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY
in
Macromolecular Science and Engineering

Robert B. Moore, chairman
Timothy E. Long
Judy S. Riffle
Kenneth A. Mauritz
S. Richard Turner

December 09, 2009
Blacksburg, Virginia

Keywords: perfluorosulfonate ionomers, Nafion[®], anisotropic morphology,
proton exchange membrane, orientation, crystallinity, uniaxial stretching,
electroactive polymer, ionic polymer-metal composite (IPMC)

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