Development of Lithium Disilicate Microstructure Graded Glass-Ceramic

Marianne Rose Lindsay

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

Master of Science
In
Materials Science and Engineering

David Clark, Chair
G. Q. Lu
Gary Pickrell

May 21, 2012
Blacksburg, Virginia

Keywords: Crystallization, Glass-ceramic, Lithium disilicate glass, temperature gradient, microstructure graded material, functionally graded material

Copyright 2012
Fair Use Analysis for Citation 1 (Used for obtaining Figures 1.3 and 2.1)

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech’s University Libraries: gailm@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsay


Report generated on: 05-14-2012 at : 12:47:41

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: in favor of fair use

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: in favor of fair use

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: in favor of fair use

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: in favor of fair use

Based on the information you provided, your use of the copyrighted work weighs: in favor of fair use

Details about analysis of fair use (Opens in a new window)

Print this page or save as PDF
Fair Use Analysis for Citation 2 (Used for obtaining Figure 1.5 and Equation 2)

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailm@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsey


Report generated on: 05-14-2012 at : 12:49:52

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: in favor of fair use

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: in favor of fair use

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: in favor of fair use

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: in favor of fair use

Based on the information you provided, your use of the copyrighted work weighs: in favor of fair use

Details about analysis of fair use (Opens in a new window)

Print this page or save as PDF.
Fair Use Analysis for Citation 3 (Used for obtaining Figures 1.1, 1.2, 1.3, and 1.4 and Equation 3)

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmoc@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsay


Report generated on 05-14-2012 at 12:35:52

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: in favor of fair use

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: in favor of fair use

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: in favor of fair use

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: in favor of fair use

Based on the information you provided, your use of the copyrighted work weighs: in favor of fair use

Details about analysis of fair use (Opens in a new window)

Print this page or save as PDF.
Fair Use Analysis for Citation 4 (Used for obtaining Figure 1.3)

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsay


Report generated on: 05-14-2012 at: 12:51:45

Based on the information you provided:

Factor 1
Your consideration of the purpose and character of your use of the copyright work weighs: in favor of fair use

Factor 2
Your consideration of the nature of the copyrighted work you used weighs: in favor of fair use

Factor 3
Your consideration of the amount and substantiality of your use of the copyrighted work weighs: in favor of fair use

Factor 4
Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: in favor of fair use

Based on the information you provided, your use of the copyrighted work weighs: in favor of fair use

Details about analysis of fair use. (Opens in a new window)

Print this page or save as PDF.
Fair Use Analysis for Citation 5 (Used for obtaining Figure 1.7)

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailmac@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsay


Report generated on: 05-14-2012 at: 12:54:56

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyrighted work weighs: in favor of fair use

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: in favor of fair use

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: in favor of fair use

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: in favor of fair use

Based on the information you provided, your use of the copyrighted work weighs: in favor of fair use

Details about analysis of fair use (Opens in a new window)

Print this page or save as PDF.
Fair Use Analysis for Citation 6 (Used for obtaining Figure 1.6)

Draft 09/01/2009
(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech's University Libraries: gailm@vt.edu)
(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsay
Report generated on: 05-14-2012 at 12:56:09

Based on the information you provided:

Factor 1
Your consideration of the purpose and character of your use of the copyright work weights: in favor of fair use

Factor 2
Your consideration of the nature of the copyrighted work you used weights: in favor of fair use

Factor 3
Your consideration of the amount and substantiality of your use of the copyrighted work weights: in favor of fair use

Factor 4
Your consideration of the effect or potential effect on the market after your use of the copyrighted work weights: in favor of fair use

Based on the information you provided, your use of the copyrighted work weights: in favor of fair use

Details about analysis of fair use (Opens in a new window)
Print this page or save as PDF
Fair Use Analysis for Citation 8 (Used for obtaining Equation 1)

Draft 09/01/2009

(Questions? Concerns? Contact Gail McMillan, Director of the Digital Library and Archives at Virginia Tech’s University Libraries: galmac@vt.edu)

(Please ensure that Javascript is enabled on your browser before using this tool.)

Virginia Tech ETD Fair Use Analysis Results

This is not a replacement for professional legal advice but an effort to assist you in making a sound decision.

Name: Marianne Lindsay


Report generated on: 05-14-2012 at: 13:03:43

Based on the information you provided:

Factor 1

Your consideration of the purpose and character of your use of the copyright work weighs: in favor of fair use

Factor 2

Your consideration of the nature of the copyrighted work you used weighs: in favor of fair use

Factor 3

Your consideration of the amount and substantiality of your use of the copyrighted work weighs: in favor of fair use

Factor 4

Your consideration of the effect or potential effect on the market after your use of the copyrighted work weighs: in favor of fair use

Based on the information you provided, your use of the copyrighted work weighs: in favor of fair use

Details about analysis of fair use (Opens in a new window)

Print this page or save as PDF.