**CURRICULUM VITATE**

**Name : Seon-Hyo, Kim, Ph.D**

**Professor, Emeritus**

**Pohang University of Science and Technology (POSTECH)**

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**PERSONAL INFORMATION :**

**Date of Birth 16 July, 1954**

**Nationality Republic of Korea**

**Gender Male**

**EDUCATIONAL BACKGROUND :**

**Carnegie-Mellon University, Pittsburgh, PA, USA (Aug. 1982 - Dec. 1986)**

**Ph.D / supervisor : Richard J. Fruehan, and M.E. / suervisor : Hani Henein Materials Science & Engineering, Ph.D (December, 1986), and M.E.(August, 1983)**

**Seoul National University, Seoul, Korea ( Mar. 1977 - Jan. 1979)**

**Master of Science(M.S.) in Metallurgical Engineering (January, 1979)**

**Seoul National University, Seoul, Korea (Mar. 1973 - Jan. 1977)**

**Bachelar of Science(B.S.) in Metallurgical Engineering ( January, 1977)**

**PROFESSIONAL EXPERIENCES:**

**Professor, Emeritus of Materials Science and Engineering (Sep. 2019 - )**

**Pohang University of Science and Technology (POSTECH)**

**Professor of Materials Science and Engineering (Aug. 1987 - Aug. 2019)**

**Pohang University of Science and Technology (POSTECH)**

**Officer(Leutenant), Navy of Republic of Korea (Mar. 1979 - Jun. 1982)**

**Carnegie-Mellon University(CMU), Pittsburgh, PA, USA**

**Department of Materials Science and Engineering**

**Post doctoral Researcher** **Dec. 1986 – Jul. 1987**

**Visiting scholar Jan. 1995 – Feb. 1996**

**University of Illinois at Urbana-Champaign (UIUC)**

**Department of Mechanical Science and Engineering**

**Visiting Research Professor Sep. 2003 - Aug. 2019**

**Visiting Scholar Sep. 2003 - Aug. 2004**

**Visiting Scholar Mar. 2011 - Feb. 2012**

**Colorado School of Mines(CSM)**

**Department of Mechanical Engineering**

**Visiting Scholar Jun. 2016 - Feb. 2019**

**Designated POSCO professor of research excellency in Ferrous and non-Ferrous metal extraction and refining (Jan. 2010 - Aug. 2019)**

**Technology-consulting committee member of POSCO (Mar. 2003 - Aug. 2019)**

**Public affair committee member of Korean Institute of Metals and Materials (2006 - 2017)**

**Korean chapter director: American Iron and Steel Society(AIME-ISS)(1995- 2019)**

**Science/Engineeing Consultant of Korea National Research Foundation(2007-13)**

**SPECIALTIES :**

**Process optimization of various materials extraction and synthesis :**

 **Thermodynamics / Equilibrium**

 **Materials Processing Kinetics of heterogeneous reaction system**

 **Transport phenomena (heat and mass transfer, fluid flow )**

**Electrochemical reaction related processes :**

 **Corrosion prevention**

 **Battery and cell development**

 **Hydrometallurgical extraction of various non-metals**

**Clean steel technology development :**

 **Steel refining employing thermodynamics and reaction kinetics**

 **Slab surface defect control employing fluid flow and heat transfer-**

 **associated computational modelling**

 **Eco-friendly steelmaking and CO2 reduction process development**

**RESEARCH SPECIALTIES :**

**Thermodynamics and Kinetics relevant to eco-friendly clean steel technology**

**Computational modelling of transient fluid flow and heat transfer phenomena in a mold of steel slab caster**

**Process development and optimization for ferrous and non-ferrous metals extraction , refining, and solidification**

**Thin film fabrication and characterization of semi-conducting materials**

**Corrosion and Prevention**

**Hydrometallurgical extraction and refining of precious metals (Environmental protection and energy related materials)**

**TEACHING CAREER (1987 - 2019) :**

 **Materials thermodynamics/Statistical thermodynamics**

**Steelmaking reaction related thermodynamics and kinetics**

**Corrosion and prevention (metals and semiconducting materials)**

 **Electrochemical reaction related thermodynamics and kinetics**

 **Transport phenomena (heat and mass transfer / fluid flow dynamics)**

 **Solidification**

**TEXTBOOKS (Authored) :**

**Thermodynamics of materials science and engineering (신소재 열역학) printed in Korean language, HongReung Press (2020), ISBN 979-11-5600-744-99(93550)**

**Lecture notes in English/Korean (PDF files) of MSE specialty-core subjects on**

 **Thermodynamics of materials science and engineering**

 **Statistical materials thermodynamics**

 **Kinetics of materials reaction/mass transfer involving-process**

 **Understanding interrelation between kinetics and materials thermodynamics**

**HongReung Press (2022)**

**RESEARCH PUBLICATIONS (10 years period from 2003 - 2014) :**

1. **M.-D.Seo, J.W.Cho, K.-C.Kim and S.-H.Kim “Evolution of Non-Metallic Inclusions in Ultra Low Carbon Steel after Aluminum Deoxidization” ISIJ INTERNATIONAL, 54 (2014), pp.475-481**
2. **C.-B.Shi, M.-D.Seo, J.W.Cho and S.-H.Kim “Crystallization Characteristics of CaO–Al2O3 Based Mold Flux and Their Effects on In-Mold Performance during High-Aluminum TRIP Steels Continuous Casting” METALLURGICAL AND MATERIALS TRANSACTION B, 45B (2014), pp.1081-1097**
3. **M.-D.Seo, C.-B.Shi, J.W.Cho and S.-H.Kim “Crystallization Behaviors of CaO-SiO2-Al2O3-Na2O-CaF2-(Li2O-B2O3) Mold Fluxes” METALLURGICAL AND MATERIALS TRANSACTION B, 45B (2014), DOI: 10.1007/s11663-014-0091-2**
4. **S.-H.Shin, J.W.Cho and S.-H.Kim “Shear thinning behavior of calcium silicate based mold fluxes at 1623K” J. AMERICAN CERAMIC SOCIETY, DOI: 10.1111/jace.13149**
5. **Synthesis and microstructural properties of ZnO nanorods on Ti-buffer layers, JOURNAL OF CRYSTAL GROWTH, 314, 264-267 (2011)**
6. **Effect of Stopper-Rod Misalignment on Fluid Flow in Continuous Casting of Steel, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 42, 300-315 (2011)**
7. **Structural and Electrical Properties of Nitrogen Ion Implanted ZnO Nanorods, CURRENT APPLIED PHYSICS, 11, 328-332 (2011)**
8. **Microstructural Properties at the Interfaces of ZnO Nanorods and ZnO Homo-Buffer Layers, JOURNAL OF NANOSCIENCE AND NANOTECHNOLOGY, 10, 912-918 (2010)**
9. **Structural and Electrical Properties of ZnO Nanorods and Ti Buffer Layers, APPLIED PHYSICS LETTERS, 96, - (2010)**
10. **Effect of Refractory Properties on Initial Bubble Formation in Continuous-Casting Nozzles, METALS AND MATERIALS INTERNATIONAL, 16, 501-506 (2010)**
11. **In-situ X-ray Absorption Fine Structure Study of TiO2 Nanoparticles under Ultraviolet Light, JAPANESE JOURNAL OF APPLIED PHYSICS, 49, 31105- (2010)**
12. **Structural and Optical Properties of Hydrogen-ion-implanted ZnO Nanorods, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 56, 2050-2054 (2010)**
13. **Local structural, magnetic, and optical properties of Zn1-xFexO thin films, JOURNAL OF CRYSTAL GROWTH, 312, 2093-2097 (2010)**
14. **Modification and Minimization of Spinel(Al2O3 center dot xMgO) Inclusions Formed in Ti-Added Steel Melts, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 41, 790-797 (2010)**
15. **Study of thermal behavior in a Kroll reactor for the optimization of Ti sponge production, MATERIAL SCIENCE FORUM, 654, 839-842 (2010)**
16. **Prediction and control of subsurface hooks in continuous cast ultra-low-carbon steel slabs, IRONMAKING & STEELMAKING, 36, 39-49 (2009)**
17. **Structural, optical, and electronic properties of room temperature ferromagnetic GaCuN film grown by hybrid physical-chemical vapor deposition", JOURNAL OF MATERIALS RESEARCH, 24, 1716-1721 (2009)**
18. **A Large Quantity of ZnO Nanorods Grown at Room Temperature, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 55, 94-97 (2009)**
19. **In-situ and ex-situ ZnO nanorod growth on ZnO homo-buffer layers, JOURNAL OF CRYSTAL GROWTH, 311, 4491-4494 (2009)**
20. **Characterizations of n-type ferromagnetic GaMnN thin film grown on GaN/Al2O3 (0001) by metal-organic chemical vapor depositionCharacterizations of n-type ferromagnetic GaMnN thin film grown on GaN/Al2O3 (0001) by metal-organic chemical vapor deposition, JOURNAL OF MAGNETISM AND MAGNETIC MATERIALS, 321, 3833-3838 (2009)**
21. **Hole-induced ferromagnetic properties of Fe-added ZnO films, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 53, 249-252 (2008)**
22. **Structural analysis of ZnO nanorods grown on a ZnO homo-buffer layer by using MOCVD, JOURNAL OF KOREAN PHYSICAL SOCIETY, 53, 304-308 (2008)**
23. **Transient Mold Fluid Flow with Well- and Mountain-Bottom Nozzles in Continuous Casting of Steel, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 39, 870-884 (2008)**
24. **Structural and magnetic properties of Zn1-xFexO thin films synthesized by RF magnetron sputtering, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 52, 805-809 (2008)**
25. **Structural and optical properties of nitrogen-ion-implanted ZnO nanorods, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 52, 954-959 (2008)**
26. **The synthesis and hydraulic properties of Calcium Sulfo Aluminate(CSA) derived from secondary refining slag, JOURNAL OF THE KOREAN INSTITUTE OF METALS AND MATERIALS, 46, 437-442 (2008)**
27. **Transient mold fluid flow with well- and mountain- bottom nozzles in steel continuous casting,, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 39, (2008)**
28. **Hole-Induced Ferromagnetic Properties of Fe-Added ZnO Films, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 53, 249-252 (2008)**
29. **Structural and Magnetic Properties of Zn1-xFexO Thin Films Synthesized by RF Magnetron Sputtering, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 52, 805-809 (2008)**
30. **Structural Analysis of ZnO Nanorods Grown on a ZnO Homo-Buffer Layer by Using MOCVD, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 53, 304-308 (2008)**
31. **Mossbauer study of iron ordering, in mixed valence system LuFe2O4, PHYSICA STATUS SOLIDI B-BASIC SOLID STATE PHYSICS, 244, 4566-4569 (2007)**
32. **Growth of homoepitaxial ZnO film on ZnO nanorods and light emitting diode applications, NANOTECHNOLOGY, 18, - (2007)**
33. **Characterizations of ferromagnetic Zn1-xCoxO thin films grown on Al2O3 (0001) by reactive radio-frequency magnetron sputtering coupled with post-growth annealing, THIN SOLID FILMS, 515, 2864-2871 (2007)**
34. **Structural properties of nitrogen-ion implanted.ZnO nanorods, JOURNAL OF THE KOREAN PHYSICAL SOCIETY, 50, 1557-1560 (2007)**
35. **Microstructure near corners of continuous-cast steel slabs showing three-dimensional frozen meniscus and hooks, ACTA MATERIALIA, 55, 6705-6712 (2007)**
36. **Homoepitaxial ZnO filim growth on vertically aligned ZnO nanorods, JOURNAL OF CRYSTAL GROWTH, 303, 580-584 (2007)**
37. **Microstructure near corners of continuous-cast steel slabs showing three-dimensional frozen meniscus and hooks, ACTA MATERIALIA, 55, 6705-6712 (2007)**
38. **Structural properties of nitrogen-ion implanted ZnO nanorods, JOURNAL OF KOREAN PHYSICAL SOCIETY, 50, 1557-1560 (2007)**
39. **. Homoepitaxial ZnO film growth on vertically aligned ZnO nanorods, JOURNAL OF CRYSTAL GROWTH, 303, 580-584 (2007)**
40. **Growth of homoepitaxial ZnO film on ZnO nanorods and light emitting diode applications, NANOTECHNOLOGY, 18, - (2007)**
41. **Surface roughness and strain effects on ZnO nanorod growth, APPLIED PHYSICS LETTERS, 88, (2006)**
42. **Structural and optical properties of Zn1-xMgxO thin films synthesized with metal organic chemical vapor deposition, JOURNAL OF ELECTRONIC MATERIALS, 35, 1680-1684 (2006)**
43. **Micrograph evidence of meniscus solidification and sub-surface microstructure evolution in continuous-cast ultralow-carbon steels, ACTA MATERIALIA, 54, 1165-1173 (2006)**
44. **X-ray observation of phosphorus vaporization from steelmaking slag and suppression method of phosphorus reversion in liquid iron, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 37, 99-107 (2006)**
45. **A new mechanism of hook formation during continuous casting of ultra-low-carbon steel slabs, METALLURGICAL AND MATERIALS TRANSACTIONS A-PHYSICAL METALLURGY AND MATERIALS SCIENCE, 37A, 1597-1611 (2006)**
46. **. Measurement and prediction of lubrication, powder consumption, and oscillation mark profiles in ultra-low carbon steel slabs, ISIJ INTERNATIONAL, 46, 1635-1644 (2006)**
47. **The effect of carbon in slag on steel reoxidation by CaO-SiO2-Al2O3-MgO-MnOFetO slags, STEEL RESEARCH INTERNATIONAL, 76, 287-295 (2005)**
48. **Effects of post-annealing temperature on structural, optical, and electrical properties of ZnO and Znl-xMgxO films by reactive RF magnetron sputtering, JOURNAL OF CRYSTAL GROWTH, 283, 170-179 (2005)**
49. **Growth and characterization of ZnO film on sapphire by the helicon wave oxygen-plasma-assisted evaporation process, JAPANESE JOURNAL OF APPLIED PHYSICS PART 1-REGULAR PAPERS BRIEF COMMUNICATIONS & REVIEW PAPERS, 44, 3218-3221 (2005)**
50. **Effects of ferrite grain size and martensite volume fraction on dynamic deformation behaviour of 0 center dot 15C-2 center dot 0Mn-0 center dot 2Si dual phase steels, MATERIALS SCIENCE AND TECHNOLOGY, 21, 967-975 (2005)**
51. **The effect of CaF2on thermodynamics of CaO-CaF2-SiO2(-MgO) slags, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 35, 115-120 (2004)**
52. **Growth and characterization of ZnO film on Si(111) substrate by helicon wave plasma-assisted evaporation, JOURNAL OF CRYSTAL GROWTH, 268, 184-191 (2004)**
53. **The effect of carbon in slag on steel reoxidation and carbon analysis by X-ray photoelectron spectroscopy in the CaO-SiO2-Al2O3-MgO-MnO-FetO system, METALLURGICAL AND MATERIALS TRANSACTIONS B-PROCESS METALLURGY AND MATERIALS PROCESSING SCIENCE, 35, 1087-1095 (2004)**
54. **Design of TiO2 nanoparticle self-assembled aromatic polyamide thin-film-composite (TFC) membrane as an approach to solve biofouling problem, JOURNAL OF MEMBRANE SCIENCE, 211, 157-165 (2003)**
55. **Influences of ZnO buffer layers on the quality of ZnO films synthesized by the metal-organic chemical vapor deposition process, JOURNAL OF ELECTRONIC MATERIALS, 32, 1148-1154 (2003)**
56. **Investigation of Ti/Al and TiN/Al thin films as the stable ohmic contact for p-type 4H-SiC, JOURNAL OF ELECTRONIC MATERIALS, 32, 501-504 (2003)**
57. **Dissolution kinetics of delta ferrite in AISI 304 stainless steel produced by strip casting process, MATERIALS SCIENCE AND ENGINEERING A-STRUCTURAL MATERIALS PROPERTIES MICROSTRUCTURE AND PROCESSING, 356, 390-398 (2003)**
58. **The effect of poling treatment and crystal structure of PZT on fracture toughness and fatigue resistance, JOURNAL OF MATERIALS SCIENCE, 38, 1787-1792 (2003)**

**59.Discharging properties of tundish slag for an improved hot-tundish recycling process, STEEL RESEARCH, 73, 194-201 (2002)**

**REFERENCES :**

**Professor Brain G. Thomas**

**University of Illinois at Urbana-Champaign(UIUC), Mechanical and Industrial Engineering (Previously)**

**Colorado School of Mines (CSM), Mechanical Engineering (Currently)**

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