

教授名录

动力工程及工程热物理

机械工程

安全科学与工程

工程力学

机械设计

动力工程及工程热物理

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梁立红 教授

主要从事先进微/纳米材料及结构的力学及相关物理、化学性能研究,对纳米材料相变热力学、薄膜弹性模量及界面能的尺度效应、纳米尺度热传导等问题进行了系统的研究。近年在微纳米结构陶瓷涂层的损伤断裂、隔热性能及界面稳定性方面做了系列研究。主持过多项国家自然科学基金项目及参加科技部重大课题等,并作为基金委、北京科委等专家评审过多个项目。在Physical Review B、Nanotechnology等材料物理类的核心期刊上及International Journal of Heat and Mass Transfer、Engineering Fracture Mechanics等力学、热学相关领域核心期刊上共发表SCI论文40余篇,文章被引用700多次,其中单篇引用过百次的两篇,与新加坡国立大学、北京大学、吉林大学、哈尔滨工业大学以及中科院金属所、物理所、硅酸盐研究所等保持密切合作。

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简历:

2003.3 吉林大学 博士

2003.4-2005.3 中科院物理所 博士后

2005.3-2007.7 新加坡国立大学物理系 研究人员

2007.7-2019.6 中科院力学所 副研究员(一级)、课题组长

2019.7-今 北京化工大学机电学院 教授

研究领域:

主要研究界面相关的先进微/纳米材料力学及相关物理、化学性能,旨在揭示先进材料及结构跨尺度热失效行为及物理机制,结合理论、实验和计算方法,理解微结构尺度、表面能等因素对固体宏观力学行为的影响规律及机制,以指导先进纳米薄膜、涂层及复合材料的应用。多次参加国际计算会、国际断裂会等作邀请报告或主持研讨,并鼓励研究生参加中国力学大会等,已先后毕业多名研究生(出国深造或到北大做博士后、或国有企业就职等)。具体研究方向包括:

1、界面性能、断裂行为宏观尺度研究、薄膜弹性温度尺度效应;

2、先进涂层结构损伤断裂跨尺度研究;

3、跨尺度热传导、纳米材料相变热力学等。

招生需求:

学术型或专业型、全日制及非全日制硕士生,欢迎有意向攻博同学,欢迎工科理科背景有志于科研的同学加入团队。

社会任职:

北京力学学会固体力学委员 (2010-)

获奖及荣誉:

2004 中科院王宽诚奖励基金

2006 吉林省科技进步一等奖“纳米材料的相变热力学”

代表论著:

先后发表40多篇SCI论文,近五年SCI他引300多次。代表论文如下:

1. H. Long, L.H. Liang*, Y. Wei, "Failure characterization of solids structures based on an equivalence of cohesive zone model", International Journal of Solids and Structures, 163 (2019)194.
2. L. H. Liang, et al., "Size-dependent damage and fracture of two-layer systems", Engineering Fracture Mechanics, 199 (2018) 635.
3. X. Fu, L.H. Liang*, Y. Wei, "Atomistic simulation study on the shear behavior of Ag/MgO interface", Computational Materials Science, 155 (2018) 116.
4. X. You, L.H. Liang*, Y. Wei, "The atomistic simulation study of Ag/MgO interface tension fracture", Computational Materials Science, 142 (2018) 277.
5. J. Li, L.H. Liang#, et al., "Experimental studies on strengthening and failure mechanism for the metal/silicone rubber/metal bonding system", International Journal of Applied Mechanics, 85 (2018) 091004.
6. H. Liu, Y. Wei, L.H. Liang*, et al., "Damage characterization model of ceramic coating systems based on energy ****ysis and bending tests", Ceramics International 44 (2018) 4807.
7. H. Yin, S. Chen, L.H. Liang*, et al., "Quantitative predictions of the whole peeling process of an elastic films on a rigid substrate", Journal of Applied Mechanics-Transactions of the ASME, 85 (2018) 091004.
8. L.H. Liang, et al., "Power-law Characteristics of damage and failure of ceramic coating systems under three-point bending", Surface and Coatings Technology, 285 (2016) 113.
9. H. Liu, L.H. Liang*, et al., "Fracture characteristics and damage evolution of coating systems under four-point bending", International Journal of Applied Ceramic Technology, 13 (2016) 1043.
10. L.H. Liang, et al., "The mechanism of high thermal shock resistance of nanostructured ceramic coatings", International Journal of Applied Ceramic Technology, 12 (2015) 1096.
11. X. Li, L.H. Liang*, et al., "Thickness-dependent fracture characteristics ceramic coatings bonded on the alloy substrates", Surface and Coatings Technology, 258 (2014) 1039.
12. S. Yang, W. Xu, L.H. Liang#, et al., "An experiment study on the dependence of the strength of adhesively bonded joints with thickness and mechanical properties of the adhesives", Journal of Adhesion Science and Technology, 28 (2014) 1055.
13. L.H. Liang, et al., "Enhanced insulation temperature and the reduced thermal conductivity of nanostructured ceramic coating systems", International Journal of Heat and Mass Transfer, 65 (2013) 219.
14. L.H. Liang, et al., "Temperature effect on elastic modulus of thin films and nanocrystals", Philosophical Magazine, 9 (2013) 574.
15. L.H. Liang, et al., "Size-dependent interface adhesive energy and enhanced interface strength of nanostructured ceramic systems", Surface and Coating Technology, 236 (2013) 525.
16. B. Wu, L.H. Liang#, et al., "A trans-scale model for size effects and intergranular fracture in nanocrystalline and ultra-fine polycrystalline metals", Computational Material Science, 57 (2012) 2.
17. L.H. Liang, et al., "Size-dependent elastic modulus and vibration of nanocrystals", Journal of Nanomaterials, 2011 (2011) 670857.
18. L.H. Liang, et al., "Interface energy and its influence on interface fracture between metal and ceramic films in nanoscale", Journal of Applied Physics, 108 (2010) 084317.
19. X. Chen, H. Ma, L.H. Liang, Y. Wei, "A surface energy model and application to mechanical properties ****ysis of single crystals at sub-micron scale", Computational Materials Science, 46 (2009) 723.
20. L. H. Liang, Yueguang Wei, B. W. Li, "Thermal conductivity of composites with nanoscale inclusions and size-dependent percolation", J. Phys.: Condens. Mat. 20 (2008) 365201.
21. L. H. Liang, Yueguang Wei, B. W. Li, "Size-dependent interface phonon transmission and thermal conductivity of nanolaminates", J. Appl. Phys. 103 (2008) 084314.
22. L. H. Liang and B. W. Li, "Size-dependent melting temperature and thermal conductivity of nanoscale semiconductors", Int. J. Mod. Phys. B 21 (2007) 4026-4029.
23. L. H. Liang and B. W. Li, "Size-dependent thermal conductivity of nanoscale semiconducting systems", Phys. Rev. B 73 (2006) 153303.
24. G. Ouyang, L. H. Liang, C. X. Wang, and G. W. Yang, "Size-dependent interface energy", Appl. Phys. Lett. 88 (2006) 091914.
25. L. H. Liang, F. Liu, D. X. Shi, W. M. Liu, X. C. Xie, and H. J. Gao, "Nucleation and reshaping thermodynamics of Ni as catalyst of carbon nanotubes", Phys. Rev. B 72 (2005) 035453.
26. L. H. Liang, G. W. Yang, B. W. Li, "Size-dependent formation enthalpy of nanocompounds", J. Phys. Chem. B 109 (2005) 16081-16083.
27. L. H. Liang, C. M. Shen, X. P. Chen, W. M. Liu, Hongjun Gao, "The size-dependent phonon frequency of semiconductors nanocrystals", J. Phys.: Condens. Mat. 16 (2004) 267-272.
28. L. H. Liang, C. M. Shen, S. X. Du, W. M. Liu, X. C. Xie, H. J. Gao, "Increase in thermal stability induced by organic coatings on nanoparticles", Phys. Rev. B 70 (2004) 205419.
29. Q. Jiang, L. H. Liang, J. C. Li, "Thermodynamic superheating of low-dimensional metals embedded in a matrix", Vacuum 72 (2004) 249-255.
30. L. H. Liang, D. Liu, Q. Jiang, "Size-dependent continuous solution phase diagram of binary system", Nanotechnology 14 (2003) 438-442.
31. L. H. Liang, J. C. Li, Q. Jiang, "Size-dependent melting depression and lattice contraction of Bi nanocrystals", Physica B 334 (2003) 49-53.
32. L. H. Liang, J. C. Li, Q. Jiang, "Modeling of melting enthalpy of organic nanowires", Phys. Status Solidi B 236 (2003) 583-588.
33. L. H. Liang, J. C. Li, Q. Jiang, "Size-dependent elastic modulus of Cu and Au thin films", Solid State Commun. 121 (2002) 453-455.
34. L. H. Liang, J. C. Li, Q. Jiang, "Superheating thermodynamics of nanocrystals based on the interface effect", Physica B 322 (2002) 188-192.
35. L. H. Liang, M. Zhao, Q. Jiang, "Melting enthalpy depression of nanoparticles based on surface effect", J. Mater. Sci. Lett. 21 (2002) 1843-1845.
36. Q. Jiang, L. H. Liang, D. S. Zhao, "Lattice contraction and surface stress of fcc nanocrystals", J. Phys. Chem. B 105 (2001) 6275-6277.
37. Q. Jiang, L. H. Liang, M. Zhao, "Modeling of the melting temperature of nano-ice in MCM-41 pores", J. Phys.: Condens. Mat. 13 (2001) L397-L401.
38. Q. Jiang, L. H. Liang, J. C. Li, "Thermodynamic superheating and relevant interface stability of low-dimensional metallic crystals", J. Phys.: Condens. Mat. 13 (2001) 565-571.

承担科研项目情况:

先后主持多项国家自然科学基金项目并作为骨干成员参加科技部重大研究计划等,如

- 1、国家自然科学基金(重大计划): 氧化铝薄膜与镍基底的高温界面强度跨尺度表征(2019-2021), 主持;
- 2、国家自然科学基金(面上): 纳米结构热障涂层的损伤灾变实验及机理研究(2017-2020), 主持;
- 3、国家自然科学基金(青年): 纳米薄膜弹性模量的尺度效应及其物理机制(2009-2011), 主持;
- 4、国家自然科学基金(专项): 纳米晶体的声子频率、热稳定性及生长(2004), 主持;
- 5、国家自然科学基金(重点): 多尺度力学的核心问题研究(2011-2014), 参加;
- 6、国家自然科学基金(重点): 高效热电材料及其应用中的关键力学问题(2009-2012), 参加;
- 7、科技部重大研究计划: 纳米材料及结构的力学新理论及精细表征技术(2012-2016), 参加;
- 8、横向课题(北理): 聚合物基复合材料性能表征(2018-2019), 主持;
- 9、合作课题(北大): 离散与连续关联的跨尺度方法及先进材料变形机理(2018-2019), 主持;
- 10、教育部留学归国基金: 微纳米结构材料的介观尺度力学(2009), 主持。