易知使用指南

第一部分：易知简介

易知科研选题外文文献可视化在线分析平台（简称易知）以中科院 1 区 2 区核心优质学术资源为基础，在检索结果形成的“小领域”中整理和分析文献之间的引用关系，利用可视化技术实时生成多种图谱，帮助具有文献调研、开题选题、课题申请、论文写作等需求的学术研究人员直观清晰解读领域发展脉络，高效全面了解领域研究内容，方便快捷定位领域重要文献，提高细化选题方向的效率。

第二部分：选题步骤和解图方法

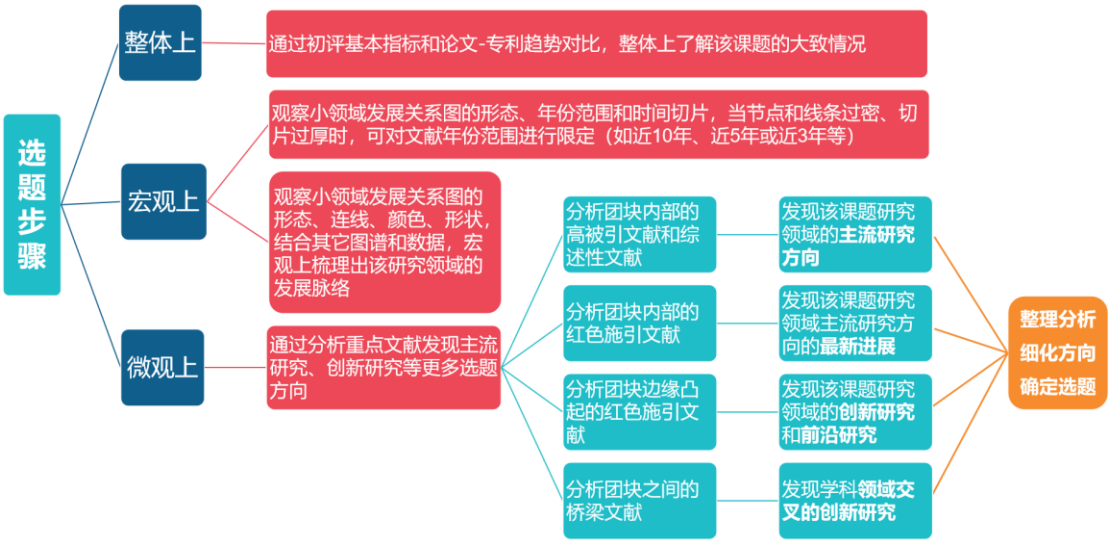


图 1 易知选题步骤

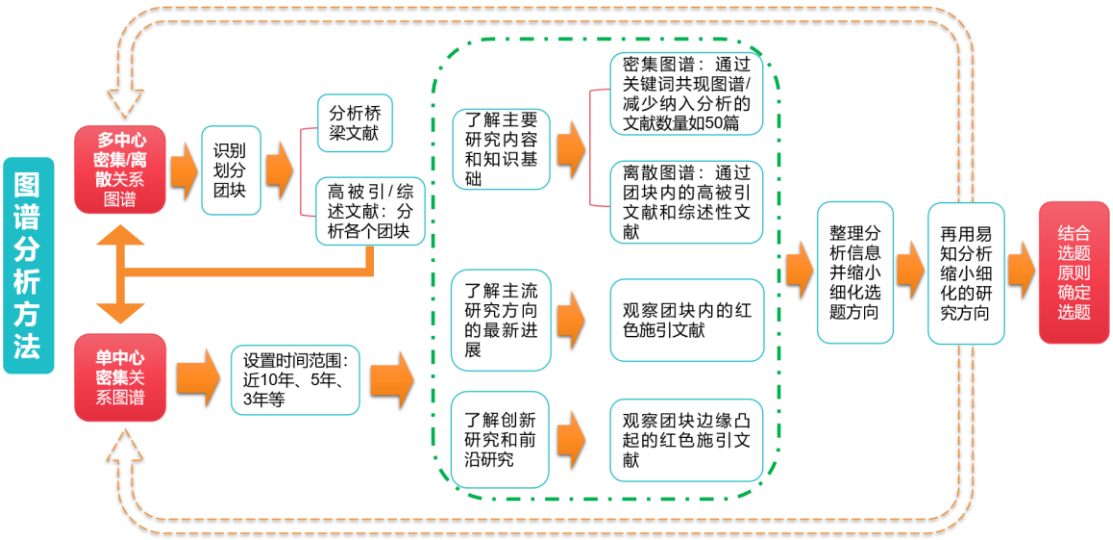


图 2 易知图谱分析方法

第三部分：使用示例——从一个关键词出发，找到更多关键词，逐步细化选题方向

1. 处理多中心密集图谱的方法：以“太阳能电池”为例

第一步：生成图谱（检索词：solar cells）

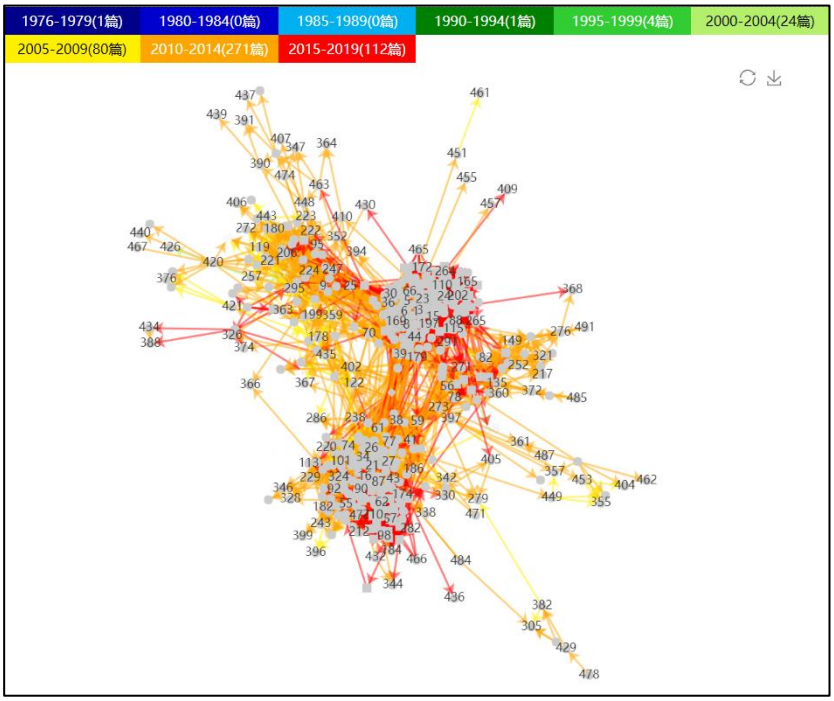


图 3 solar cells 关系图

第二步：划分团块

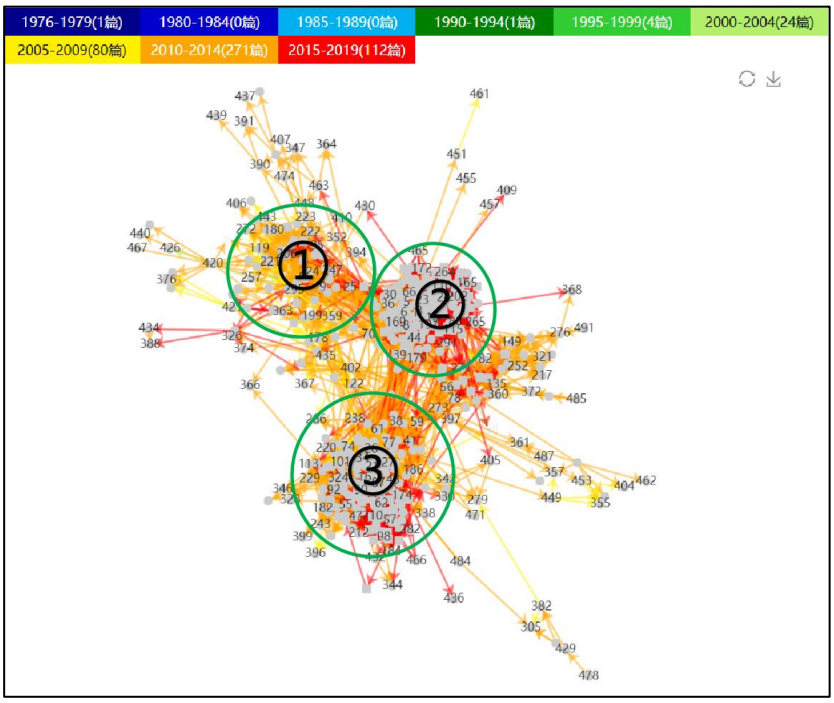


图 4 solar cells 关系图

第三步：通过各团块中的高被引文献和综述性文献了解各团块的主要研究内容

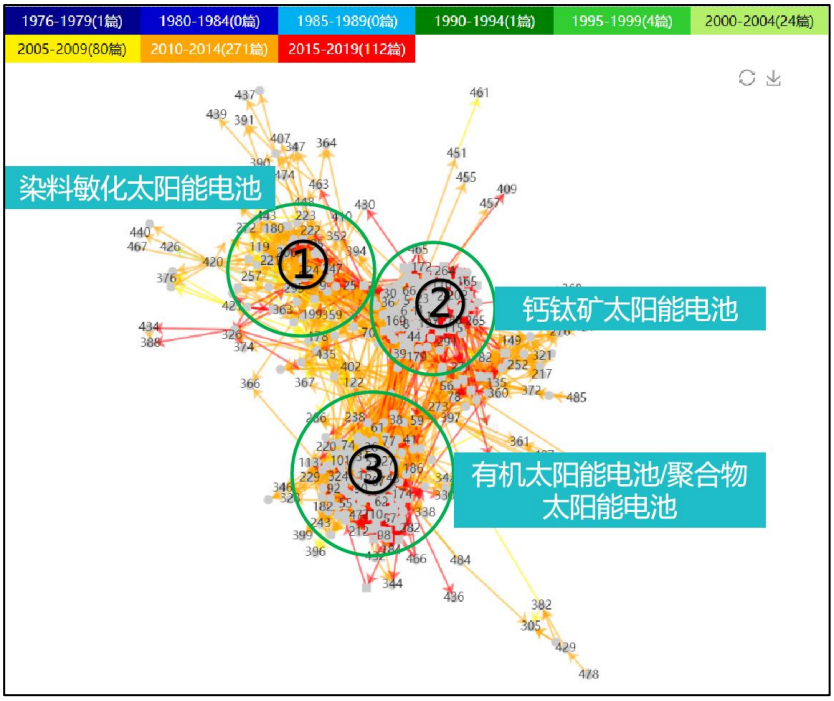


图 5 solar cells 关系图

第四步：将细化选题至“钙钛矿 + 太阳能电池”，再次检索并生成图谱

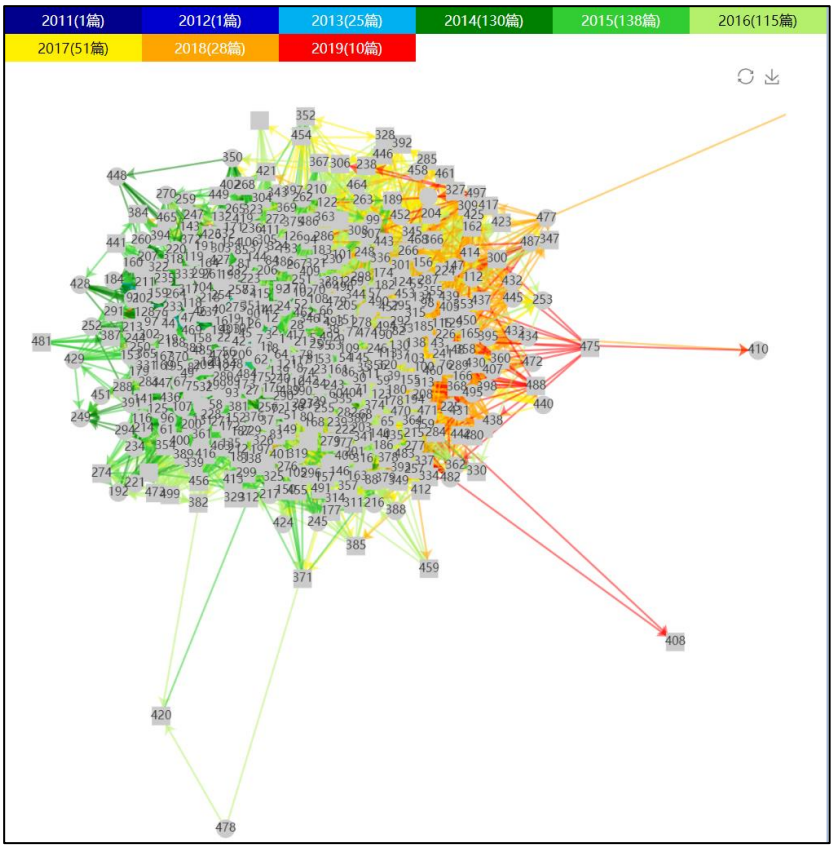


图 6 perovskite solar cells 关系图

2. 处理单中心密集图谱的方法之一：以“钙钛矿太阳能电池”为例

第一步：生成图谱（检索词：perovskite solar cells）

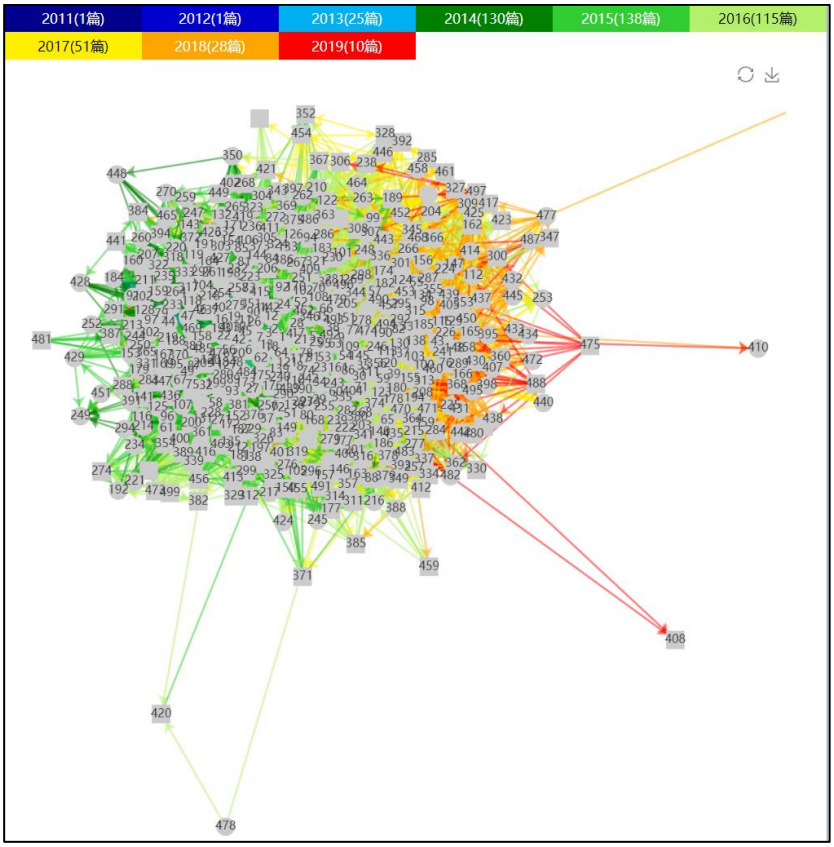


图 7 perovskite solar cells 关系图

第二步：利用关键词共现图谱发现主要研究内容

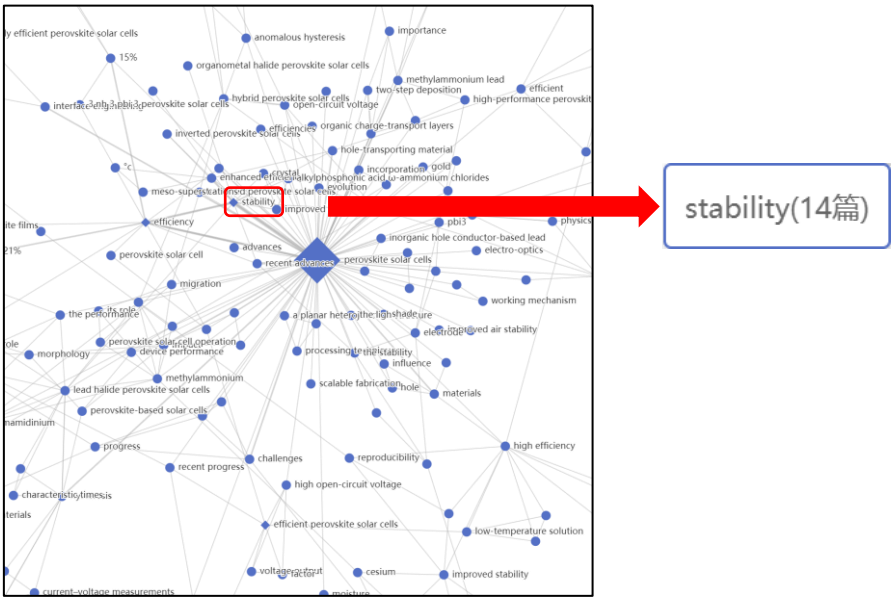


图 8 perovskite solar cells 关键词共现图

第三步：将细化选题至“钙钛矿太阳能电池 + 稳定性”，再次检索并生成图谱

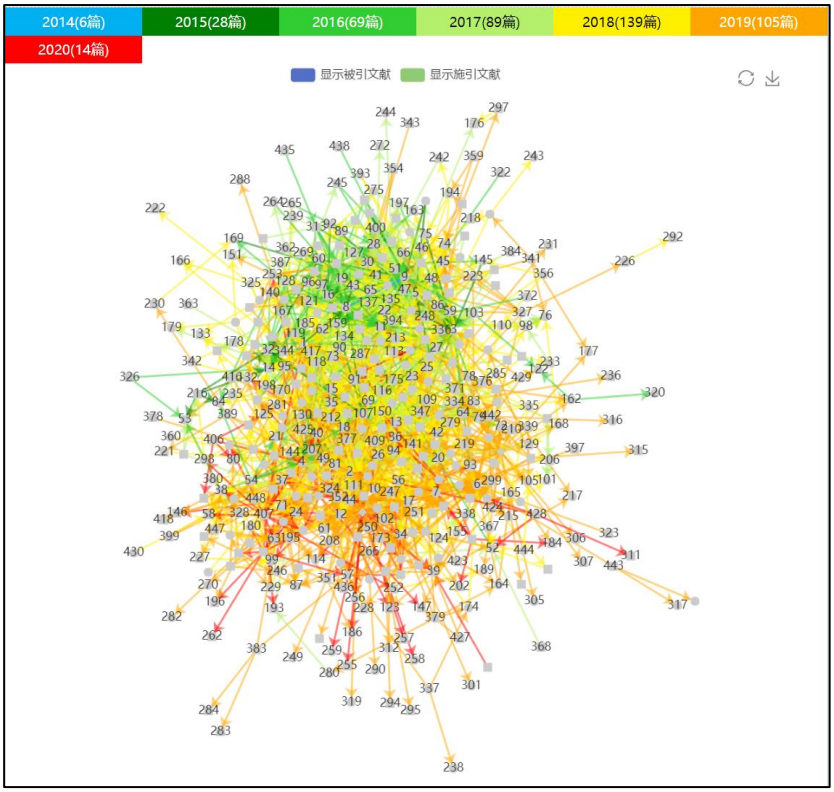


图 9 stable perovskite solar cells 关系图

3. 处理单中心密集图谱的方法之二：以“钙钛矿太阳能电池稳定性”为例

第一步：生成图谱（检索词：stable perovskite solar cells）

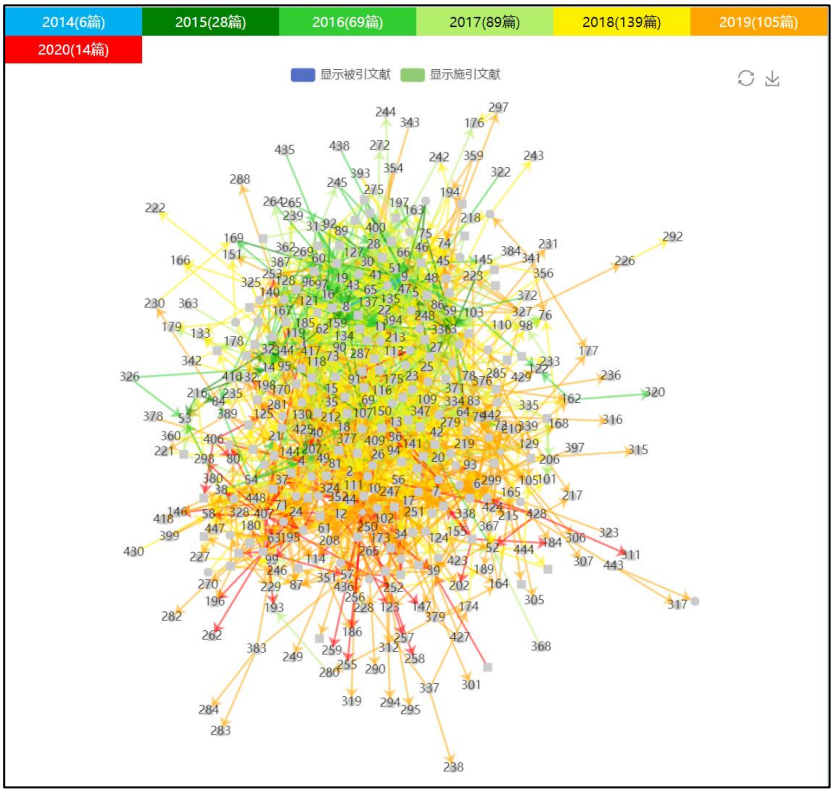


图 10 stable perovskite solar cells 关系图

第二步：设置时间范围，再次生成图谱

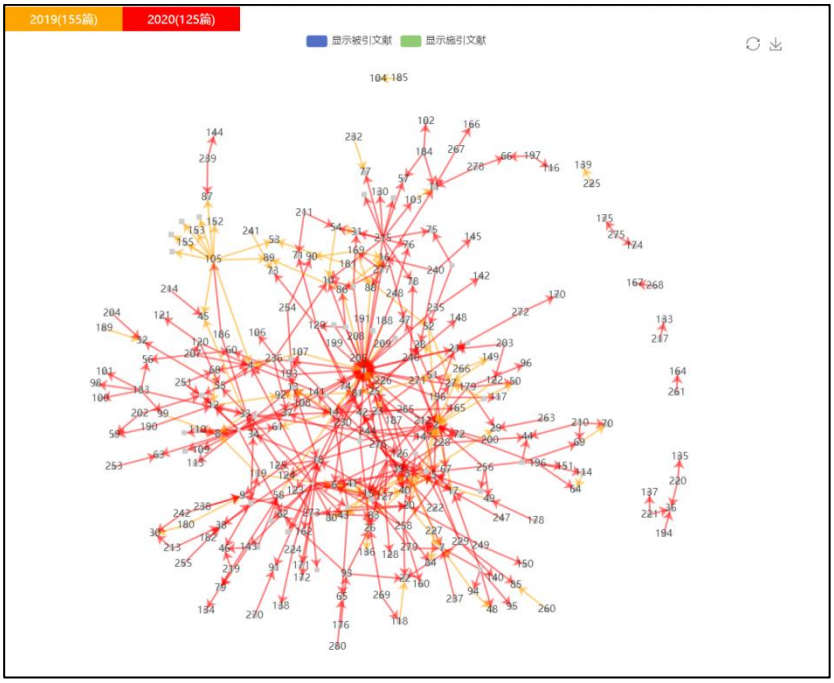


图 11 stable perovskite solar cells 关系图（近 3 年）

第三步：减少纳入分析的文献数量，再次生成图谱

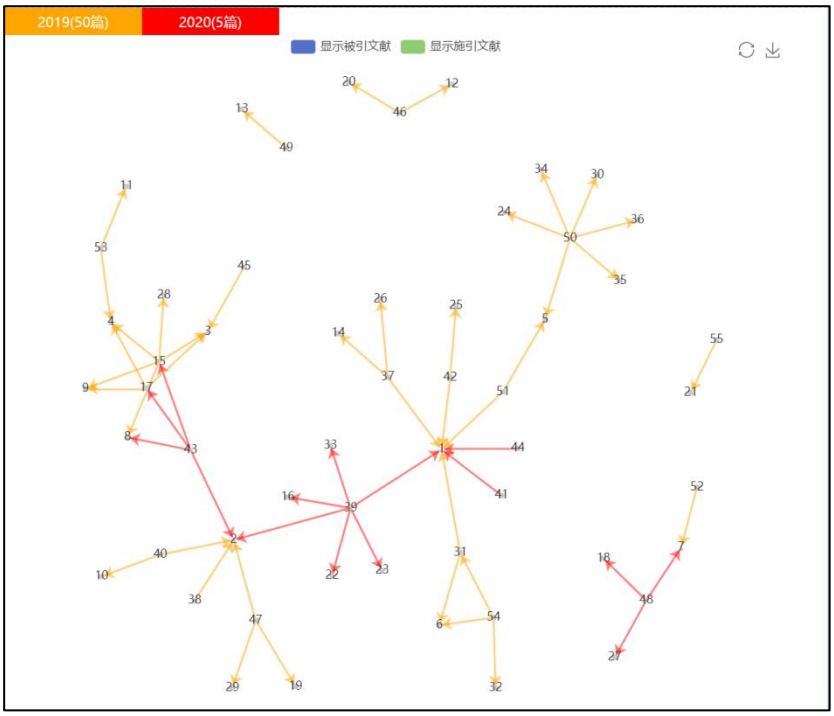


图 12 stable perovskite solar cells 关系图（100 篇）

第四步：根据文献分组信息中的“高频主题词”发现主要研究内容

	数量与占比 共:55	高频学科	高频作者	高频机构	高频主题词
2020	文献数量:5 文献占比:9%	General Materials Science Renewable Energy, Sustainability and the Environment Electronic, Optical and Magnetic Materials General Chemistry Atomic and Molecular Physics, and Optics	Fei Zhang Kai Zhu Hongwei Zhu Yuhang Liu Felix T Eickemeyer	UNSW Sydney école Polytechnique Fédérale de Lausanne Shaanxi Normal University University of North Carolina System Southern University of Science and Technology	efficient stable perovskite solar cells additive engineering tailored amphiphilic molecular mitigators
2019	文献数量:50 文献占比:91%	General Materials Science Renewable Energy, Sustainability and the Environment General Chemistry Electronic, Optical and Magnetic Materials Electrical and Electronic Engineering	Shengzhong Liu Zhike Liu Yu Han Huan Zhao Mohammad Mahdi Tavakoli	Shaanxi Normal University Huaqiao University Peking University Xidian University Nankai University	perovskite solar cells efficient stable stable perovskite solar cells highly efficient

图 13 stable perovskite solar cells 关系图的分组信息表

第五步：将选题细化至“钙钛矿太阳能电池稳定性 + 添加剂”，再次检索并生成图谱（检索词：stable perovskite solar cells additive）

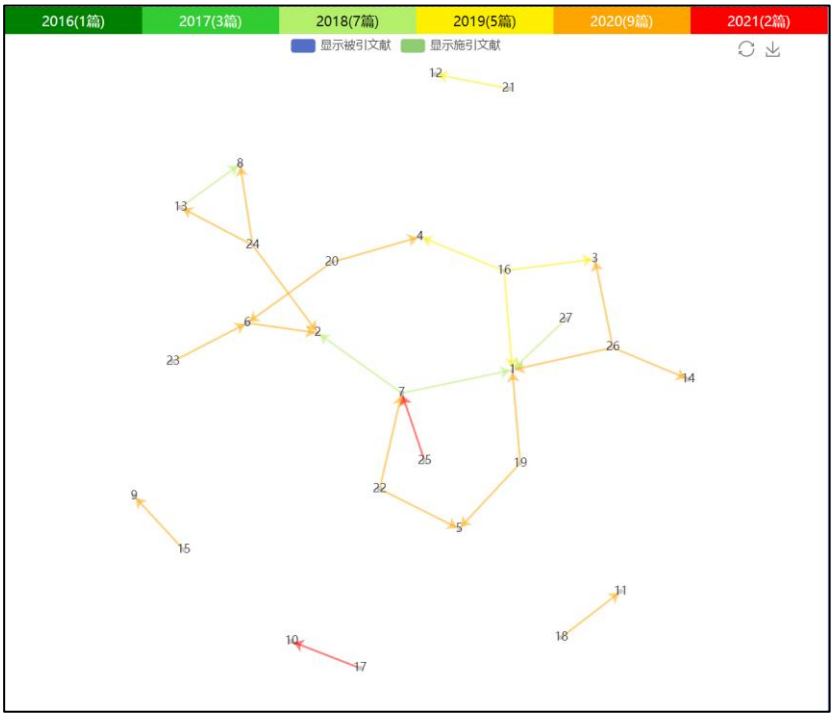


图 14 stable perovskite solar cells additive 关系图

第六步：利用“文献精选”和“相关文献”进行文献调研，发现更多关联的重要文献和新文献

图 15 stable perovskite solar cells additive 文献精选

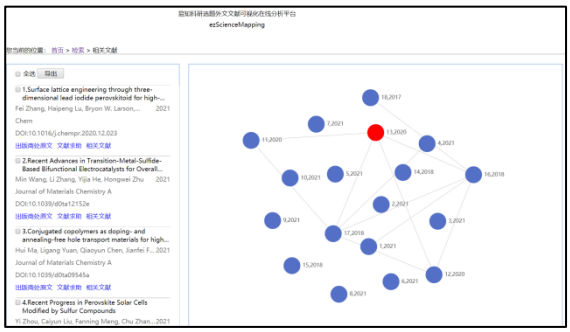


图 16 stable perovskite solar cells additive 相关文献

第七步：汇总文献调研结果，制定文献阅读计划

编号	发表年份	DOI	第一作者	标题	研究对象	研究结果	现有文献综述	文献批评	对未来研究的建议	批评点/待研究的相关问题
1	2017	10.1002/adma.201701073	Yongzhen Wu	Thermally Stable MAPbI3 Perovskite Solar Cells with Efficiency of 19.19% and Area over 1 cm2 achieved by Additive Engineering						
2	2017	10.1039/c7ta00894e	Mengna Sun	Tuning the crystal growth of perovskite thin-films by adding the 2-pyridylthiourea additive for highly efficient and stable solar cells prepared in ambient air						
3	2018	10.1002/aenm.201802323	Hsiang-Lin Hsu	Carbon Nanodot Additives Realize High-Performance Air-Stable p–i–n Perovskite Solar Cells Providing Efficiencies of up to 20.2%						
4	2016	10.1002/adma.201603808	Chuanjiang Qin	Multifunctional Benzoquinone Additive for Efficient and Stable Planar Perovskite Solar Cells						
5	2019	10.1039/c8ta09146c	Shuang Yu	Enabling room-temperature processed highly efficient and stable 2D Ruddlesden–Popper perovskite solar cells with eliminated hysteresis by synergistic exploitation of additives and solvents						
6	2020	10.1002/aenm.201902579	Fei Zhang	Additive Engineering for Efficient and Stable Perovskite Solar Cells						
7	2018	10.1039/c8ta02121j	Haiying Zheng	Promoting perovskite crystal growth to achieve highly efficient and stable solar cells by introducing acetamide as an additive						
8	2017	10.1039/c7ta06752f	Zhiyong Liu	Efficient and stable perovskite solar cells based on high-quality CH3NH3PbI3−xClx films modified by V2Ox additives						
9	2018	10.1002/adma.201801418	Jiangshan Feng	Record Efficiency Stable Flexible Perovskite Solar Cell Using Effective Additive Assistant Strategy						
10	2019	10.1016/j.nanoen.2019.02.070	Yanbo Gao	CsPbBr3 perovskite nanoparticles as additive for environmentally stable perovskite solar cells with 20.46% efficiency						
11	2018	10.1002/adma.201805554	Jae Choul Yu	Highly Efficient and Stable Inverted Perovskite Solar Cell Obtained via Treatment by Semiconducting Chemical Additive						

图 17 stable perovskite solar cells additive 文献调研汇总结果

4. 处理单中心密集图谱的方法之三：以石墨烯为例

第一步：生成图谱（检索词：graphene）

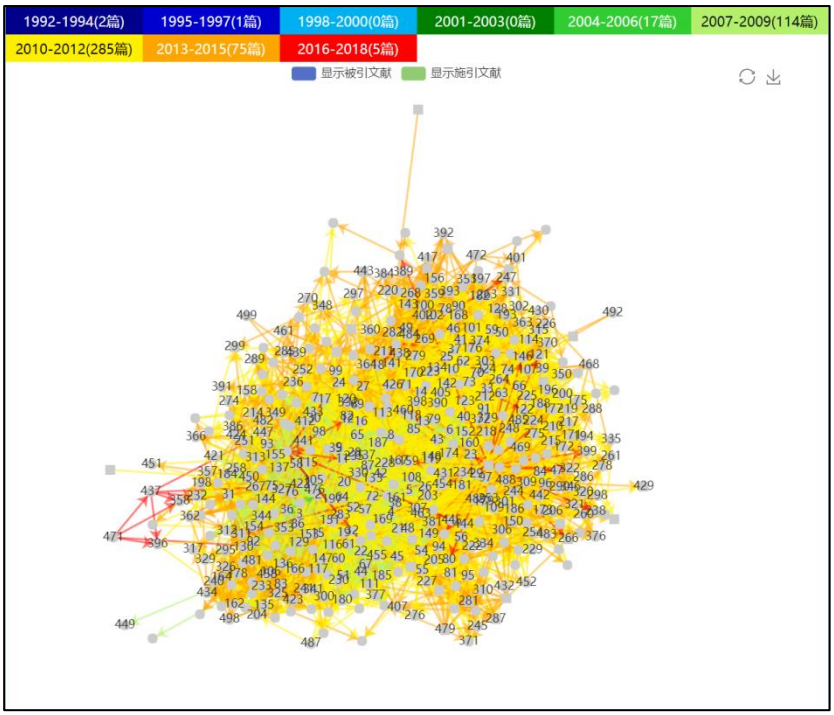


图 18 graphene 关系图

第二步：设置时间范围

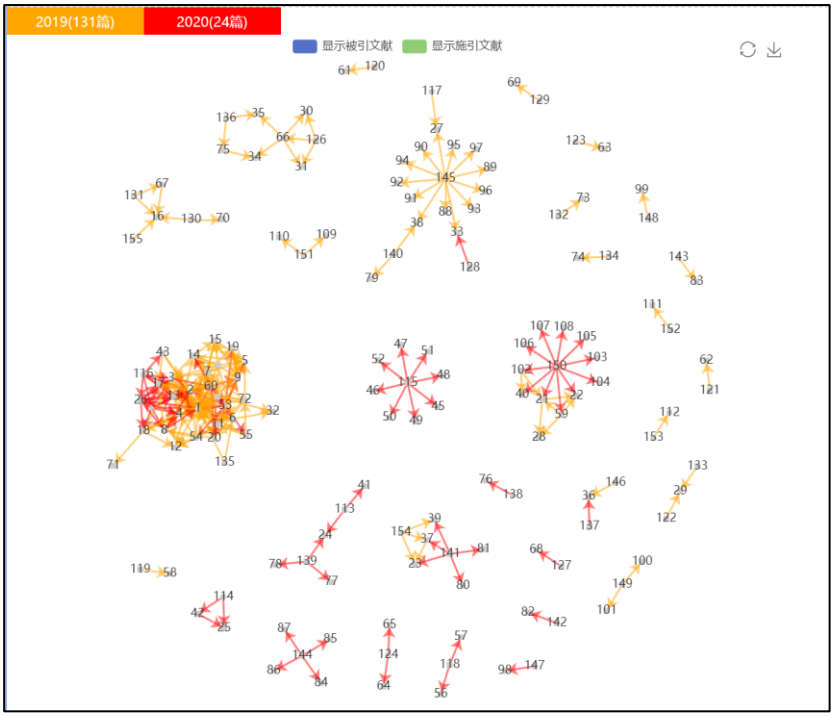


图 19 graphene 关系图（近 3 年）

第三步：划分团块

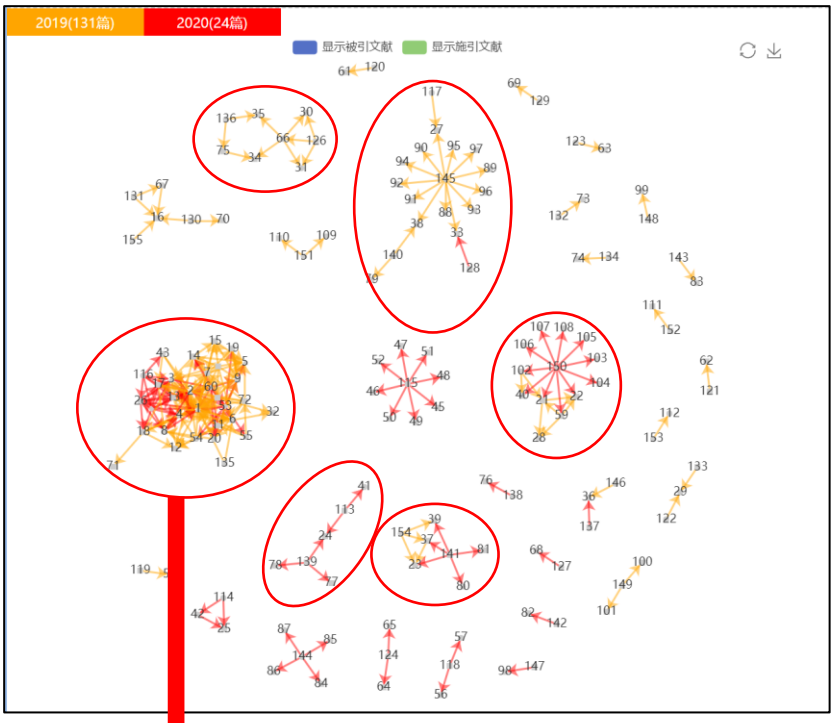
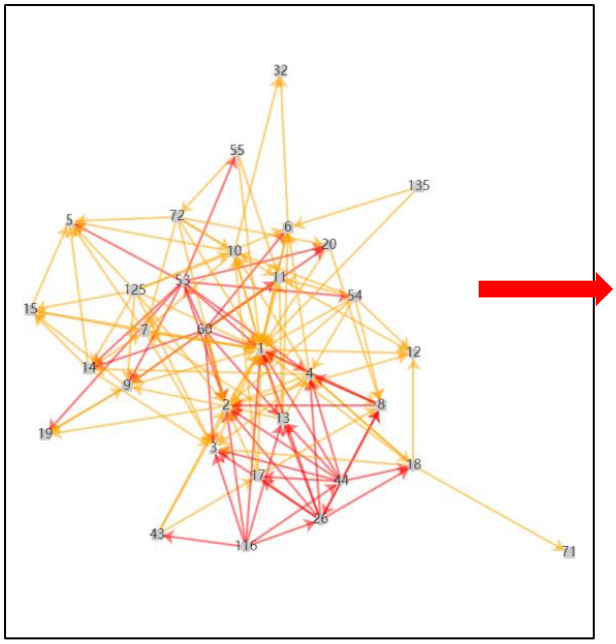


图 20 graphene 关系图（近 3 年）

第四步：通过团块中的高被引文献和综述性文献了解团块的主要研究内容



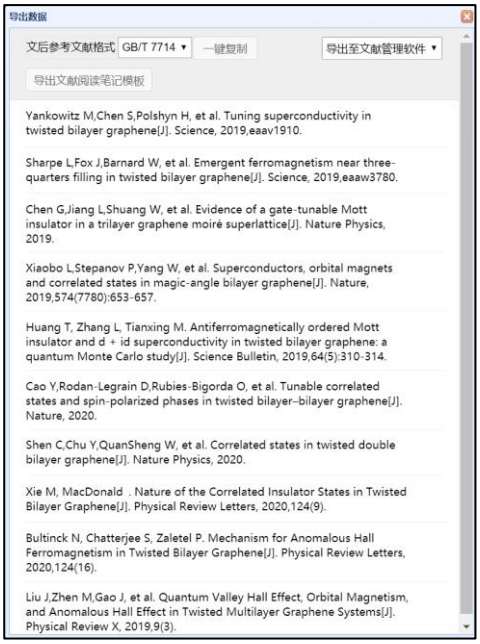


图 21 graphene 关系图局部（近 3 年）

图 22 graphene 数据导出

第五步：将选题细化至“石墨烯 + 扭转双层”，再次检索并生成图谱

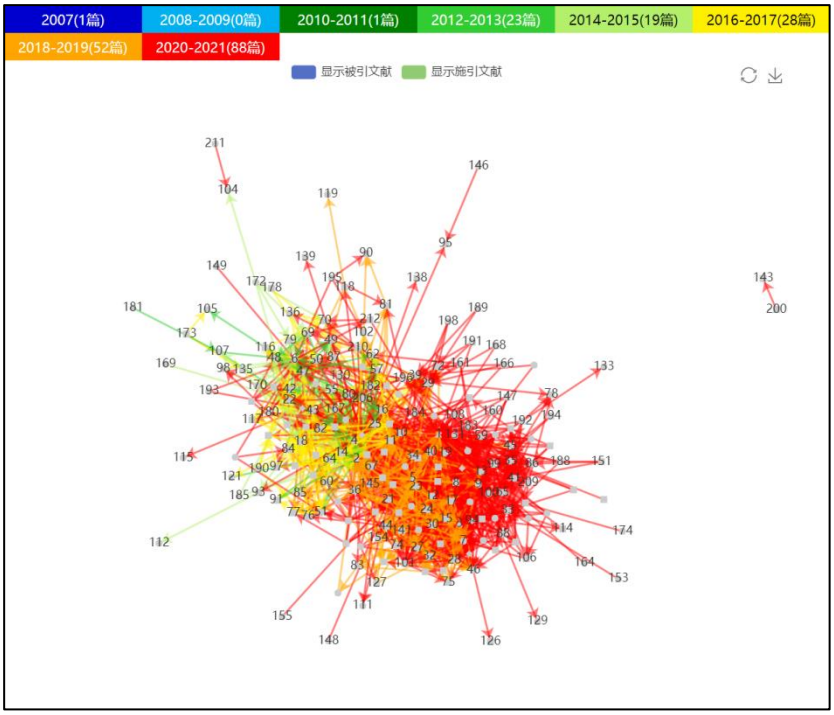


图 23 twisted bilayer graphene 关系图

5. 处理单中心密集图谱的方法之四：以“扭转双层石墨烯”为例

第一步：生成图谱（检索词：twisted bilayer graphene）

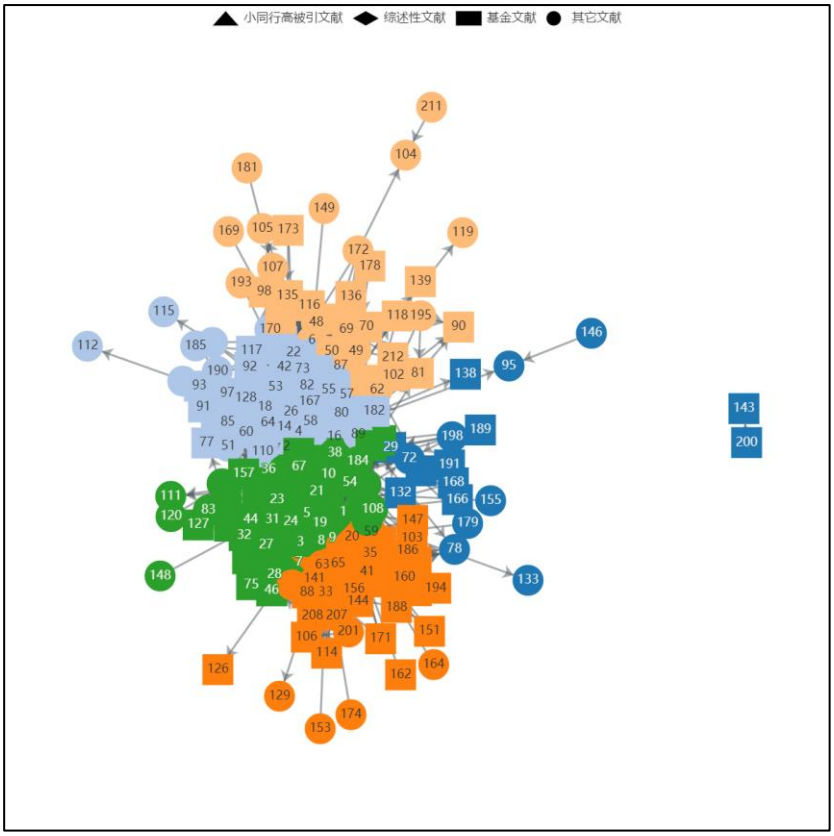


图 24 twisted bilayer graphene 脉络图

第二步：通过分组文献信息概况中的“高频主题词”了解每组文献的主要研究内容

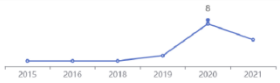
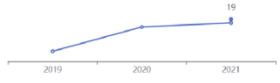
全选	数量与占比 共:212	高频学科	高频作者	高频机构	高频主题词	本组文献年份分布图
	文献数量:18 文献占比:8%	General Chemistry Mechanical Engineering General Materials Science Condensed Matter Physics Bioengineering	Kenji Watanabe Shuyang Dai Yang Xiang David J Srolovitz Kuan Zhang	University of Manchester ETH Zurich Peking University école Polytechnique Fédérale de Lausanne Rensselaer Polytechnic Institute	twisted bilayer graphene twisted double bilayer graphene minibands low-angle twisted bilayer graphene moiré	
	文献数量:53 文献占比:25%	General Materials Science General Physics and Astronomy General Chemistry Mechanical Engineering Condensed Matter Physics	Zhao-Dong Chu Yanfeng Zhang Rui-Fen Dou Lei Feng Zhongfan Liu	Peking University Beijing Normal University University of Houston National Tsing Hua University Instituto de Ciencia de Materiales de Madrid	twisted bilayer graphene van hove singularities evidence quantum hall effect van hove singularity	
	文献数量:41 文献占比:19%	General Physics and Astronomy Multidisciplinary General Chemistry General Materials Science Condensed Matter Physics	Kenji Watanabe Takashi Taniguchi K. Watanabe T. Taniguchi Yu Saito	Harvard University National Institute for Materials Science Princeton University University of Washington Massachusetts Institute of Technology	twisted bilayer graphene twisted double bilayer graphene magic-angle twisted bilayer graphene bilayer graphene states	
	文献数量:34 文献占比:16%	General Chemistry General Materials Science Mechanical Engineering Condensed Matter Physics Bioengineering	Jiwoong Park Huan Wang Han Peng Ai Leen Koh Yulin Chen	Peking University Tsinghua University Cornell University United States Naval Research Laboratory Renmin University Of China	twisted bilayer graphene superlattices angle-resolved raman imaging interlayer rotations interactions	
	文献数量:66 文献占比:31%	General Physics and Astronomy General Materials Science General Chemistry Multidisciplinary Mechanical Engineering	Kenji Watanabe Takashi Taniguchi T Stauber Ashvin Vishwanath B Andrei Bernevig	National Institute for Materials Science Harvard University Princeton University The University of Texas at Austin ETH Zurich	twisted bilayer graphene superconductivity the magic angle flat bands origin	

图 25 twisted bilayer graphene 脉络图的分组信息表

第三步：将选题细化至“扭转双层石墨烯 + 魔角”，再次检索并生成图谱（检索词：magic-angle twisted bilayer graphene）

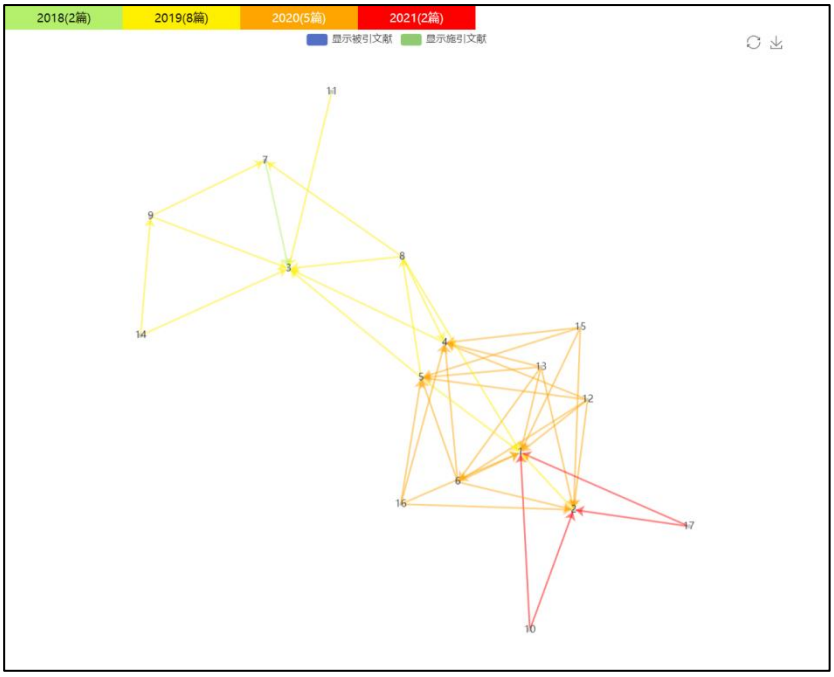


图 26 magic-angle twisted bilayer graphene 关系图

第四步：进行文献调研，汇总文献调研结果，制定文献阅读计划

编号	发表年份	DOI	第一作者	标题	研究对象	研究结果	现有文献综述	文献批评	对未来研究的建议	批评点/待研究的相关问题
1	2019	10.1038/s41567-019-0606-5	Youngjoon Choi	Electronic correlations in twisted bilayer graphene near the magic angle						
2	2019	10.1038/s41586-019-1422-x	Yonglong Xie	Spectroscopic signatures of many-body correlations in magic-angle twisted bilayer graphene						
3	2018	10.1021/acs.nanolett.8b02033	Bikash Padhi	Doped Twisted Bilayer Graphene near Magic Angles: Proximity to Wigner Crystallization, Not Mott Insulation.						
4	2019	10.1038/s41586-019-1431-9	Alexander Kerelsky	Maximized electron interactions at the magic angle in twisted bilayer graphene						
5	2019	10.1038/s41586-019-1460-4	Yuhang Jiang	Charge-order and broken rotational symmetry in magic angle twisted bilayer graphene						
6	2020	10.1038/s41586-020-2339-0	Dillon Wong	Cascade of electronic transitions in magic-angle twisted bilayer graphene						
7	2018	10.1103/physrevlett.121.217001	Cheng-Cheng Liu	Chiral Spin Density Wave and d+id Superconductivity in the Magic-Angle-Twisted Bilayer Graphene						
8	2019	10.1126/sciadv.aaw9770	Emilio Codecido	Correlated insulating and superconducting states in twisted bilayer graphene below the magic angle						
9	2019	10.1103/physrevx.9.021013	Junyeong Ahn	Failure of Nielsen-Ninomiya Theorem and Fragile Topology in Two-Dimensional Systems with Space-Time Inversion Symmetry: Application to Twisted Bilayer Graphene at Magic Angle						
10	2021	10.1038/s41563-020-00911-2	Shuang Wu	Chern insulators, van Hove singularities and topological flat bands in magic-angle twisted bilayer graphene						
11	2019	10.1103/physrevlett.122.246402	Kangjun Seo	Ferromagnetic Mott state in Twisted Graphene Bilayers at the Magic Angle						

图 27 magic-angle twisted bilayer graphene 文献调研汇总结果