【学术前沿动态】2023 年诺贝尔化学奖相关论文分析

2023 年诺贝尔化学奖被授予美国化学家蒙吉·巴文迪（Moungi G. Bawendi），美国化学家路易斯·布鲁斯（Louis E. Brus）和俄罗斯物理学家阿列克谢·叶基莫夫（Alexei I. Ekimov），以表彰他们对量子点的发现和合成作出的贡献。以下对三位诺奖得主与相关主题的学术论文和相关施引文献展开分析。

一、 获奖者的发文分析

三位获奖者相关主题的 SCIE 论文有 382 篇，最早发文年限可追溯到 1981 年，各年度发文分布如图 1 所示。其中，单篇论文被引超过 1000 次的有 21 篇，单篇最高被引达到 8146 次。ESI 高被引论文有 16 篇。

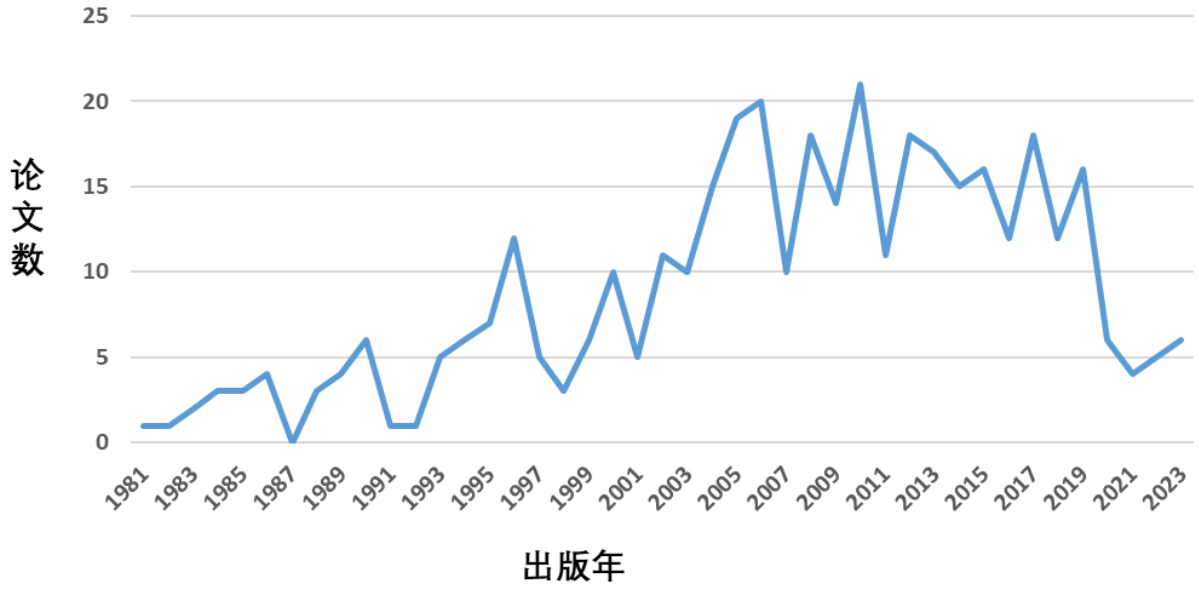

图 1 2023 年诺贝尔化学奖得主相关主题论文的年代分布

382 篇诺贝尔奖相关主题论文，由于数据库数据不全，有 12 篇论文不在分析之列；表 1 是其余 370 篇论文所涉及的 9 个 ESI 学科领域及各组论文的学科影响力表现；其中材料科学领域论文 131 篇，占比 34%，生物学及生物化学论文 8 篇，篇均被引高达 833.5 次，各组论文表现见表 1。

表 1 诺贝尔奖相关主题论文归属学科及影响力表现

ESI 学科	论文数	被引频次	篇均被引	学科规范化的引文影响力	排名前 1% 的论文	平均百分位
Materials Science	131	26679	203.66	6.84	16.03	84.34
Physics	108	33770	312.69	11	33.33	92.31
Chemistry	108	31406	290.8	10.56	29.63	90.11
Clinical Medicine	10	2127	212.7	6.74	20	91.78
Biology & Biochemistry	8	6668	833.5	18.28	50	98.76
Environment/Ecology	2	683	341.5	17.8	100	99.73
Multidisciplinary	1	600	600	27.89	100	99.44

Molecular Biology & Genetics	1	351	351	4.49	0	96.92
Engineering	1	20	20	0.72	0	63.19

获奖者相关主题论文分布于 78 种期刊，发文量位于前 3 位的期刊为：*Nano Letters*（54 篇，占比 14%），*Journal of the American Chemical Society*（39 篇，占比 10%），*Physical Review B*（29 篇，占比 8%）。

三位获奖者的相关主题学术论文详见武汉大学图书馆化学学科服务平台：https://libguides.lib.whu.edu.cn/chemistry。

二、 相关施引文献分析

截至 2023 年 12 月 6 日，三位诺贝尔化学奖得主的 382 篇相关文献被全球 73385 篇论文引用，总被引 114929 次，篇均被引频次为 305.29。从全球来看，施引文献从 1983 年到 2023 年持续增长，2020 年高达 4559 篇，如图 2 所示。全部施引文献分布在 136 个国家/地区，排名第一的是美国，发文量达 20004 篇；中国排在第二，发文量为 19575 篇。

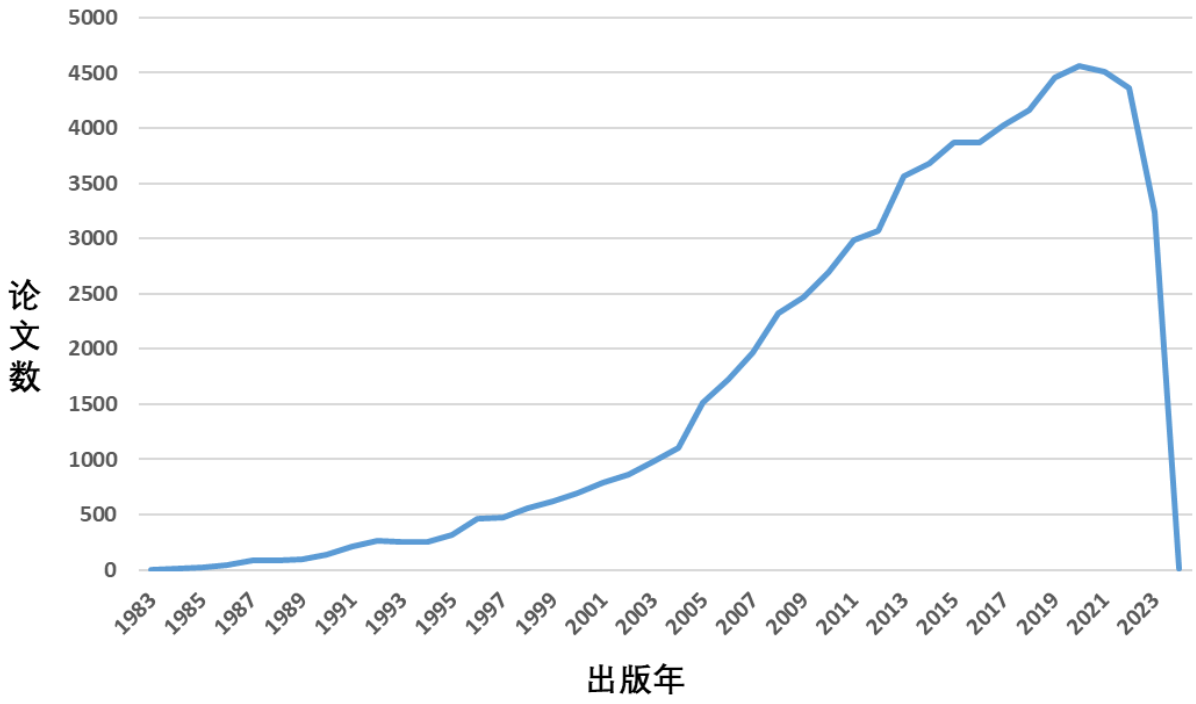

图 2 2023 年诺贝尔化学奖相关施引文献的年代分布

我们结合本次诺奖的获奖原因，从施引文献中筛选出与诺奖主题相关的论文共计 22951 篇（占全部施引文献的 31%），下面从不同角度分析这些相关施引文献。

22951 篇相关施引文献分布于 1389 种期刊，如图 3 所示，其中 *Journal of Physical Chemistry C* 占比 5%，*Nano Letters* 占比 3%，*Physical Review B* 占比 3%。相关施引文献量 TOP20 期刊见图 3。

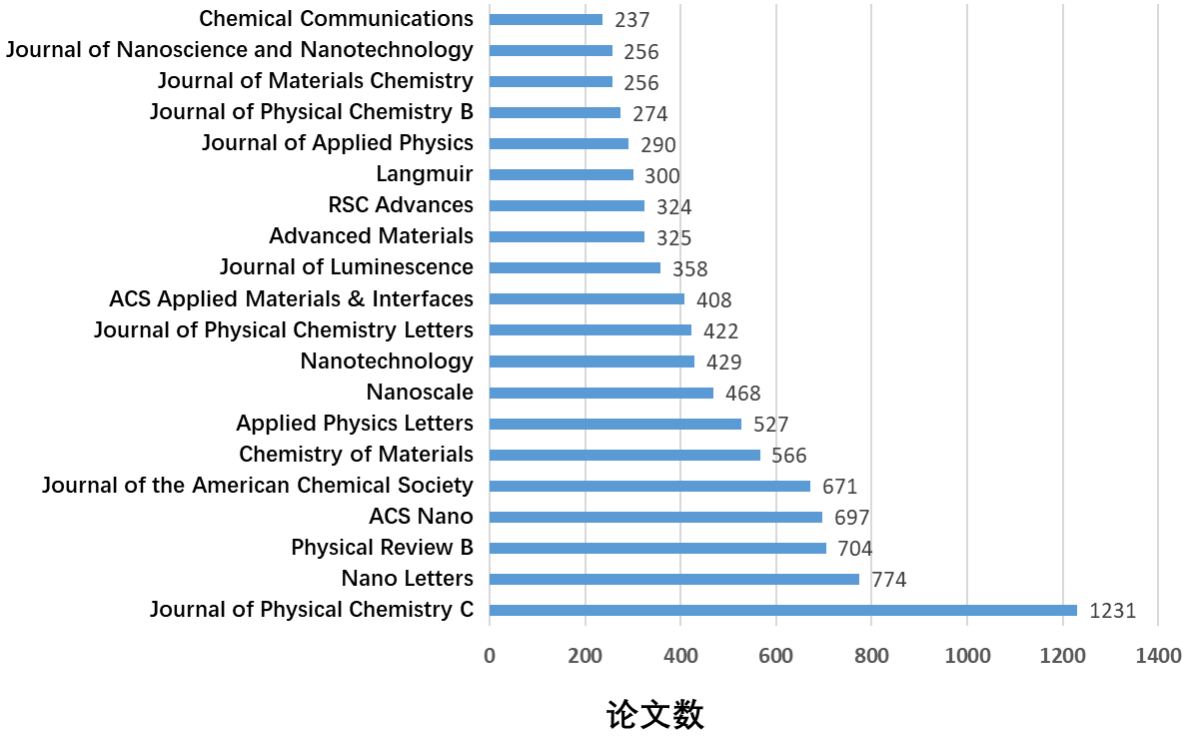

图 3 2023 年诺贝尔化学奖相关施引文献期刊分布（TOP20）

22951 篇相关施引文献涉及全球 108 个国家/地区，其中中国作者参与的相关施引文献共计 6092 篇，居全球第二，施引文献量 TOP10 机构排名如图 4 所示。

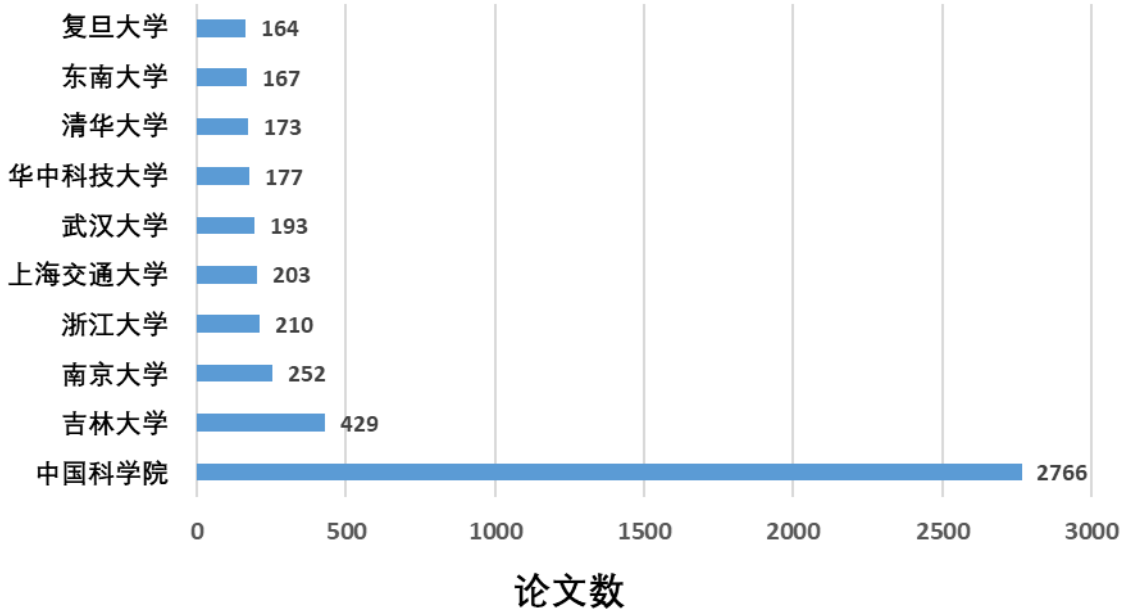

图 4 2023 年诺贝尔化学奖相关施引文献量 Top10 的中国机构

根据对相关主题施引文献的关键词的词频统计，得到高频关键词词云，出现频率最高的包括量子点（7947 次）、光学特性（2291 次）、太阳能电池（1375 次）、硒化镉量子点（1249 次）、胶体量子点（1147 次）、量子产率（1020 次）、半导体纳米微晶（760 次）、量子限域（742 次）、碲化镉量子点（719 次）、水溶液（707 次）等。详见图 5。

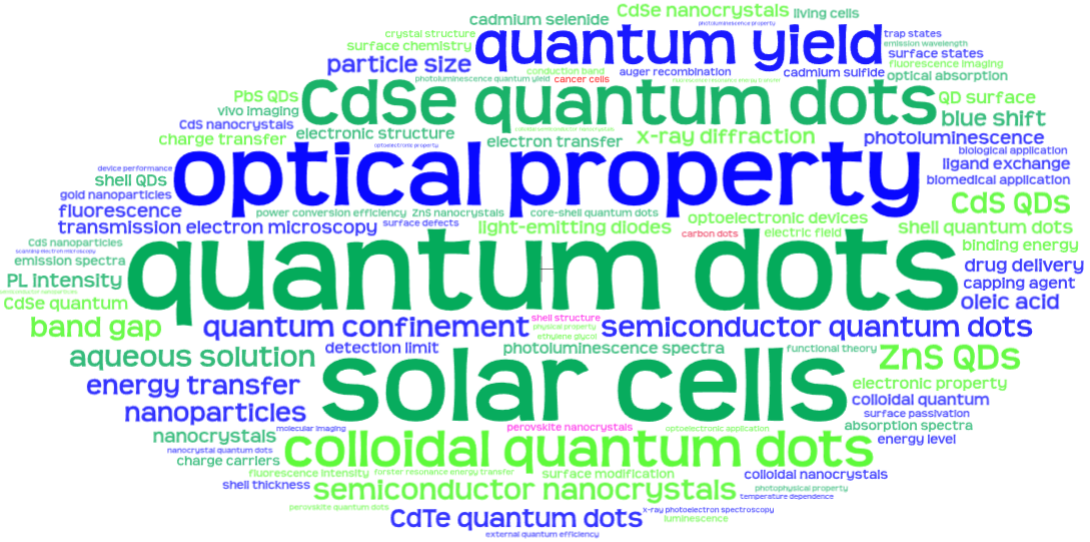

图 5　2023 年诺贝尔化学奖相关施引文献高频关键词词云图

从三位获奖者 382 篇主题相关文献词频来看，主要高频词及频率为量子点（81 次）、太阳能电池（23 次）、胶体量子点（18 次）、硒化镉纳米晶（13 次）、硒化镉量子点（12 次）等，如图 6 所示。

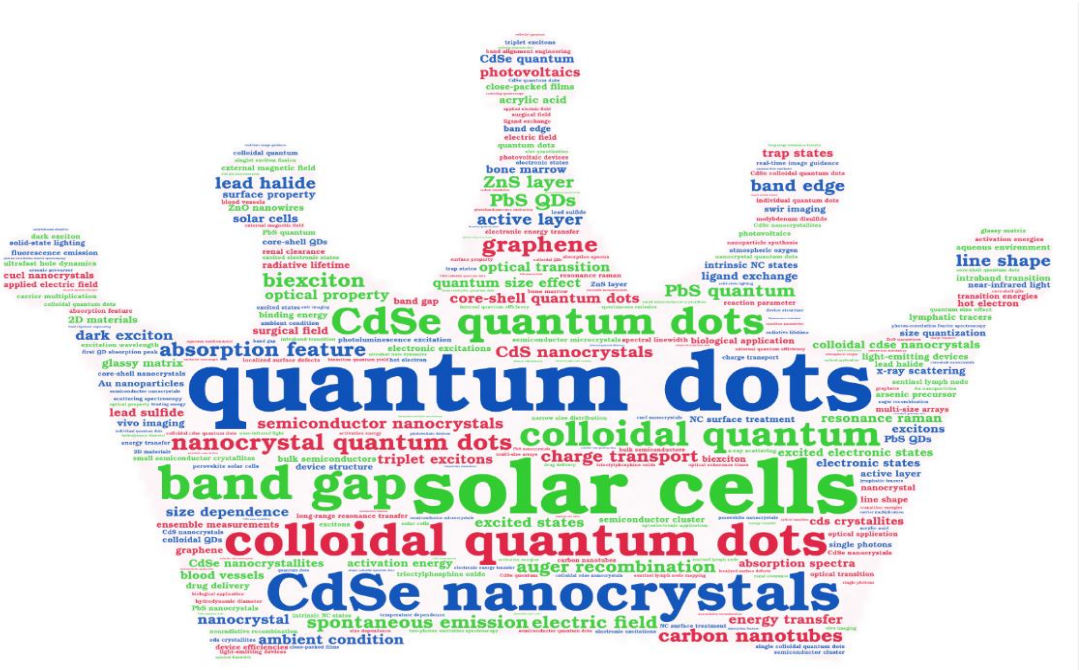

图 6　2023 年诺贝尔化学奖相关主题文献的高频关键词词云图

图 7 为关键词共现聚类时线图，该图通过关键词共现的频次反映主题间的关系以及时间发展情况，可见 2019 年以来施引文献的关键词聚类主要集中在癌细胞、瞬态吸收、光催化活性、太阳能电池、发光二极管、钙钛矿纳米晶、硫化锌量子点和发光强度等，详见图 7。

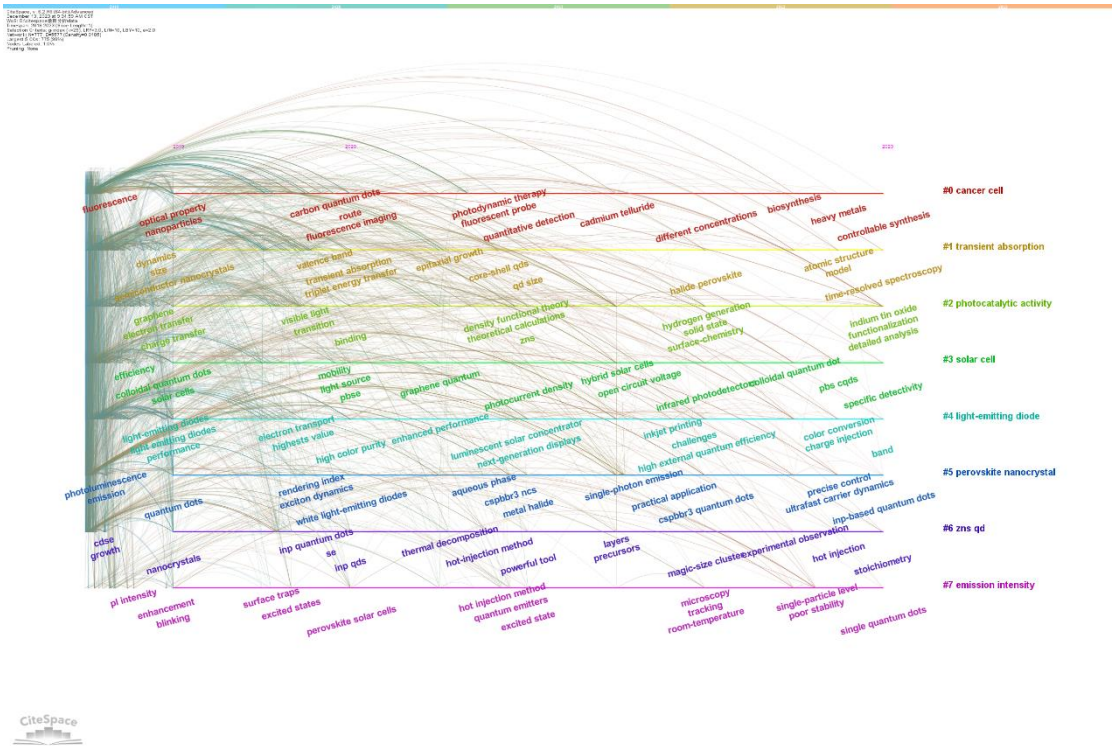

图 7 2023 年诺贝尔化学奖 2019–2023 年相关施引文献的关键词聚类时线图

三、 相关主题高影响力论文

近 10 年的诺贝尔获奖者相关主题学术论文中，ESI 高被引论文 16 篇，论文信息如下，中国机构为第一作者单位的论文见文献 16。

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四、 高影响力施引论文

2021 年来相关主题施引论文中包含 ESI 高被引论文共 23 篇，论文信息如下，其中中国机构为第一作者单位的发文见文献 1-3、5-7、10-16、18、19 和 21，ESI 热点论文见 10、17 和 23。

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