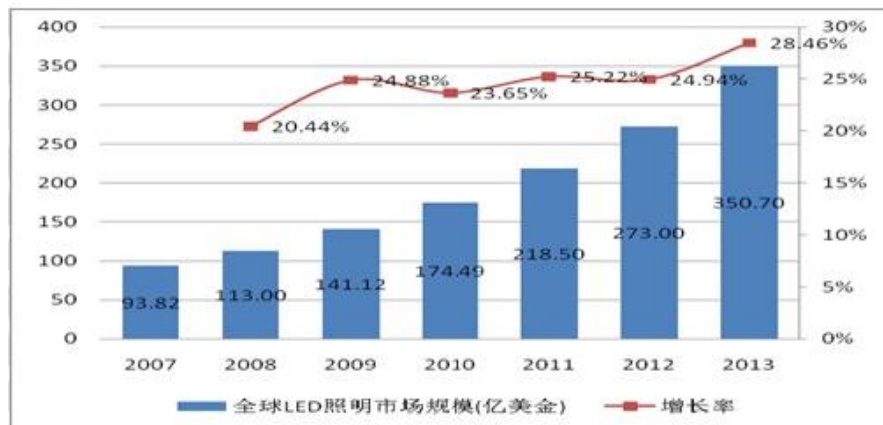


《LED 照明专利研究分析报告》

Patent analysis report of LED lighting

全球 LED(器件)产业市场规模从 2007 年的 93.82 亿美元,迅速地增长到 2013 年的 350.7 亿美元,年均增长率接近 25%,渗透率从 2012 年的 22%增长到 2013 年的 26%,到 2014 年有望达到 32.7%。

The global LED industry marketplace has grown from \$9.38 billion in 2007 to 35.07 billion in 2013. The average annual increase rate is near 25%, and market penetration rate has grown to be from 22% in 2012 to 26% in 2013, and will be 32.7% in 2014.



我国在 LED 产业上起步较晚,国内企业在 LED 核心技术和专利的掌握方面均落后于国外企业,随着国家及地方对 LED 产业的扶持逐渐加大,中国 LED 产业全面进入发展期。在技术方面,国内 LED 与国际同行的技术水平进一步接近。目前,国内研究水平为功率型芯片 130-150lm/W,功率型芯片产业化水平普遍达到 110lm/W 左右,在衬底制备、外延生长、芯片工艺等方面掌握了一批具有自主知识产权的技术,如硅衬底芯片光效达 110lm/W。在产业方面,我国 LED 企业总数超过 3000 家。其中,上游外延芯片企业约 50 多家,中游封装企业达 1000 家,下游应用企业超过 2000 家。

The LED industry in China started late, and the Chinese enterprises lie behind on holding LED core technologies and patents. With more support on the LED industry from the Chinese government, the Chinese LED industry has been in expansion. Our technology is getting close to the international advanced technology. Currently, our research is about power chip 130-150lm/W, and the

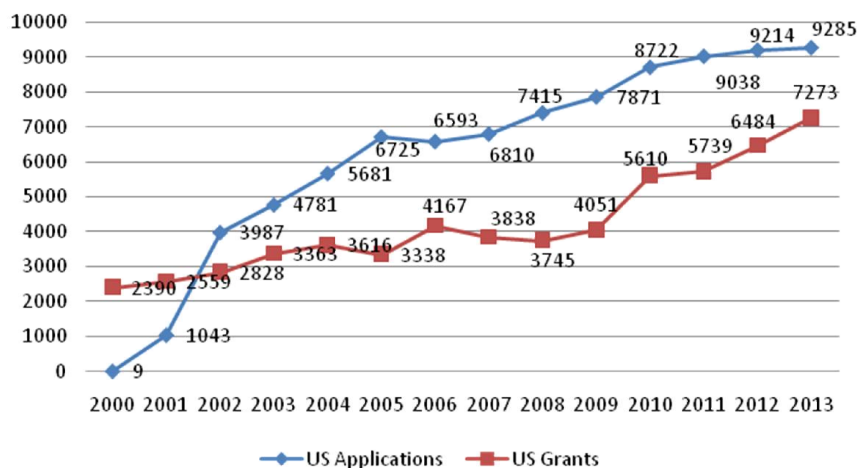
industrialized power chip is about 110lm/W. We own some technologies with proprietary intellectual property in substrate manufacturing, chip technology and so on. Right now, there are more than 3000 LED enterprises in China, with more than 50 LED wafer firms, about 1000 packaging firms, others more than 2000.

本报告主要从专利角度对 LED 领域的美国和中国专利进行了详细的研究分析。通过美国和中国 LED 技术领域的专利申请情况进行分析，重点对以日亚化学、丰田合成、飞利浦、科锐和欧司朗为代表的 LED 跨国企业的专利布局进行了深入的研究，同时对近年来 LED 领域的专利诉讼信息进行了总结。报告全文约二万五千余字。

Our report analyze the US and Chinese LED related patents, with deep analysis on the patent arrangement of giant LED enterprises like Nichia, Toyoda Gosei, Philips, Cree and Osram. The report also summarizes the patent litigation in LED industry. The full text has more than 25 thousand words.

从 LED 领域的美国专利的公开和授权总量来看，总体上呈现高速增强趋势，其中公开量从 2003 年的 3987 件上升至 2013 年的 9285 件，上升了 2 倍多。

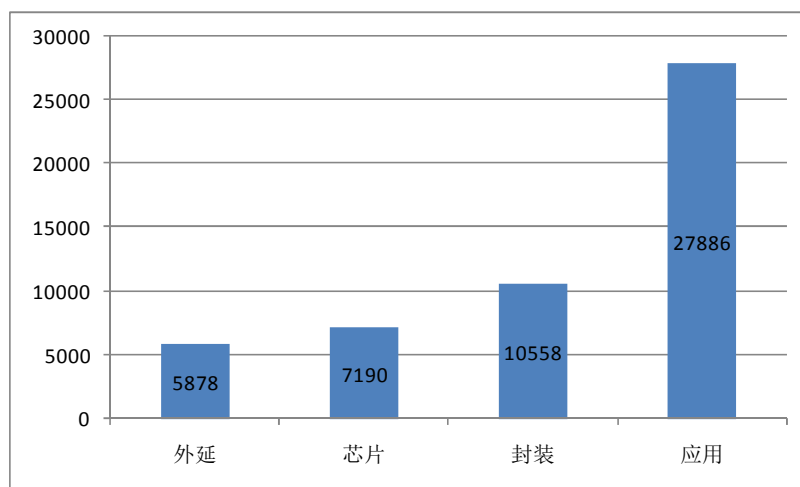
In LED field, the amount of patent application and granted patent has been increased rapidly. The published patents has grown from 3987 in 2003 to 9285 in 2013.



从美国 LED 专利的技术布局分析来看，在美国外延领域共有 5878 件专利申请，芯片领域共有 7190 件专利申请，封装领域共有 10558 件专利申请，照明应用领域共有 27886 件专利申请。

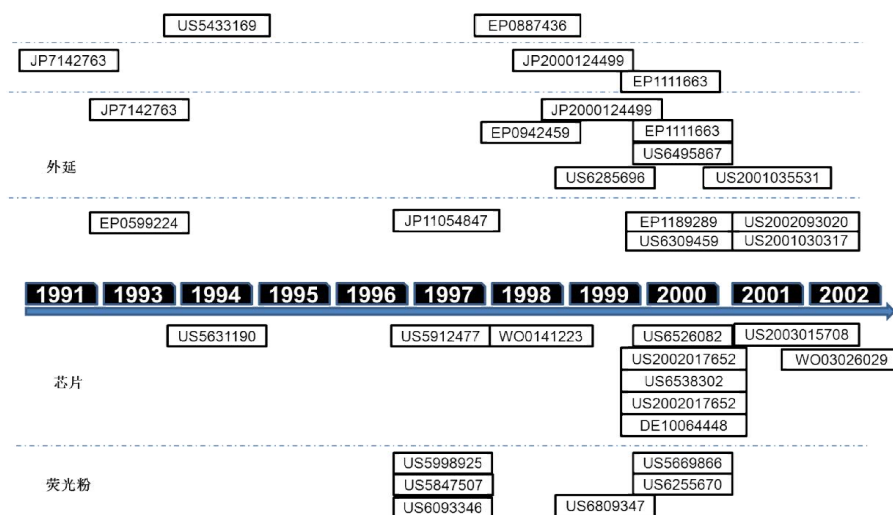
In US, 5878 patents are about LED epitaxy wafer, 7190 patents are about

chips, 10558 patents are about packaging, and 27886 patents are about illumination.



从关键技术专利路线图来看，如下图反映了白光 LED 专利技术路线。时间轴以上为外延领域专利技术路线，从上到下分别为 MOCVD 生长技术、衬底技术、缓冲层技术、活性层技术路线。时间轴以下为芯片技术和荧光粉技术路线。

The following is the patent path of key technology of white LED. The epitaxy technology is above the time line, and it is MODCVD technology, substrate technology, buffer layer technology, active layer technology, respectively. Beneath the time line, we illustrate the chip technology and phosphors technology.



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