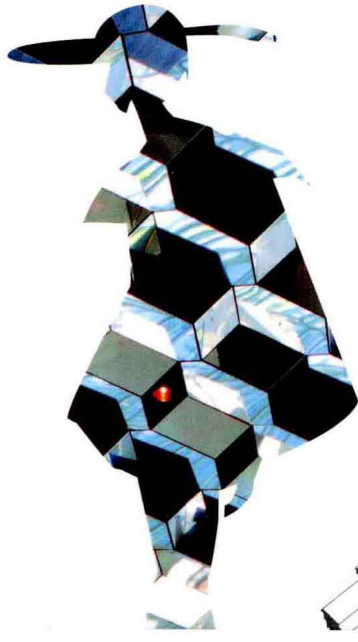
建筑“时装”定制

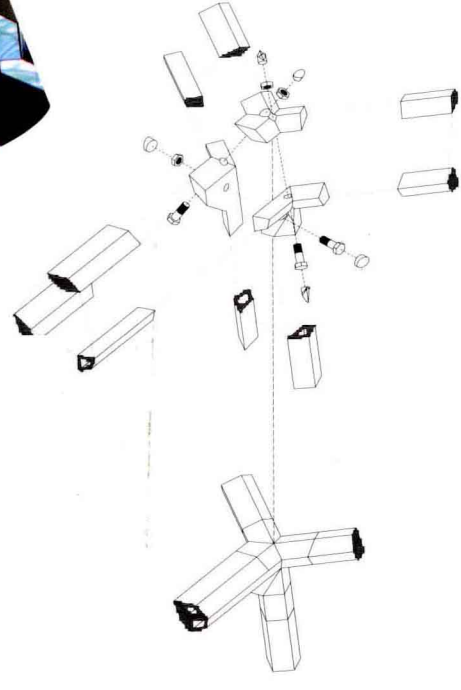
FASHION IN ARCHITECTURE

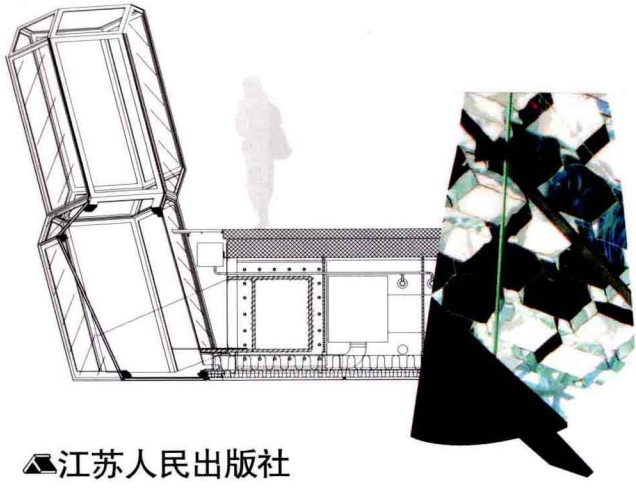
玻璃

GLASS

凤凰空间·北京　编







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策划编辑：郑亚男
责任编辑：刘 焱
特约编辑：叶 爽 田 静 李 瑶
翻 译：徐 萌 田 静
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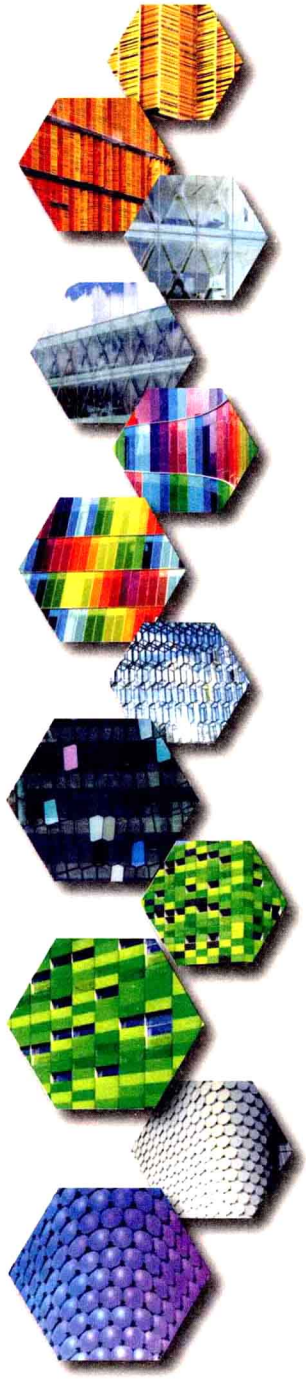
谨以此书高调迎接建筑立面的个性化时代，或者说建筑
“时装定制”时代的到来。

This book is dedicated to the forthcoming era of individualized building facades, or the era of "custom fashion" for architecture.



前 言
PREFACE

■波西·比西·谢利说："生活像一个多彩的玻璃穹顶，将永恒的白色光芒染上颜色。"

■玻璃幕墙的立面建筑自问世以来，以其自重轻、工期短及外观时尚等特点，受到建筑师的青睐。

■玻璃将外面的世界带进来，反之亦然。

■玻璃是一种空灵通透的"无材料"，这与 20 世纪建筑师们对"虚无"的崇拜相符合。

■今天的设计师们依然挖掘着它的潜力。

■ Percy Bysshe Shelley once said, "Life, like a dome of many-colored glass, stains the white radiance of Eternity."

■ Since glass façade appeared in architecture , it became popular with architects with various advantages, such as its light weight, short construction period and exquisite appearance.

■ Glass brings the outside world inside and vice versa.

■ Glass is a sort of intangible, transparent "non-material", which corresponds to the architects' adoration for "nihility" in the 20th century.

■ Nowadays, designers are still tapping its potential.

第一部分 PART 1

建筑玻璃“时装”历史
HISTORY OF GLASS "FASHION" IN ARCHITECTURE

第二部分 PART 2

建筑玻璃“时装”案例
CASES OF GLASS "FASHION" IN ARCHITECTURE

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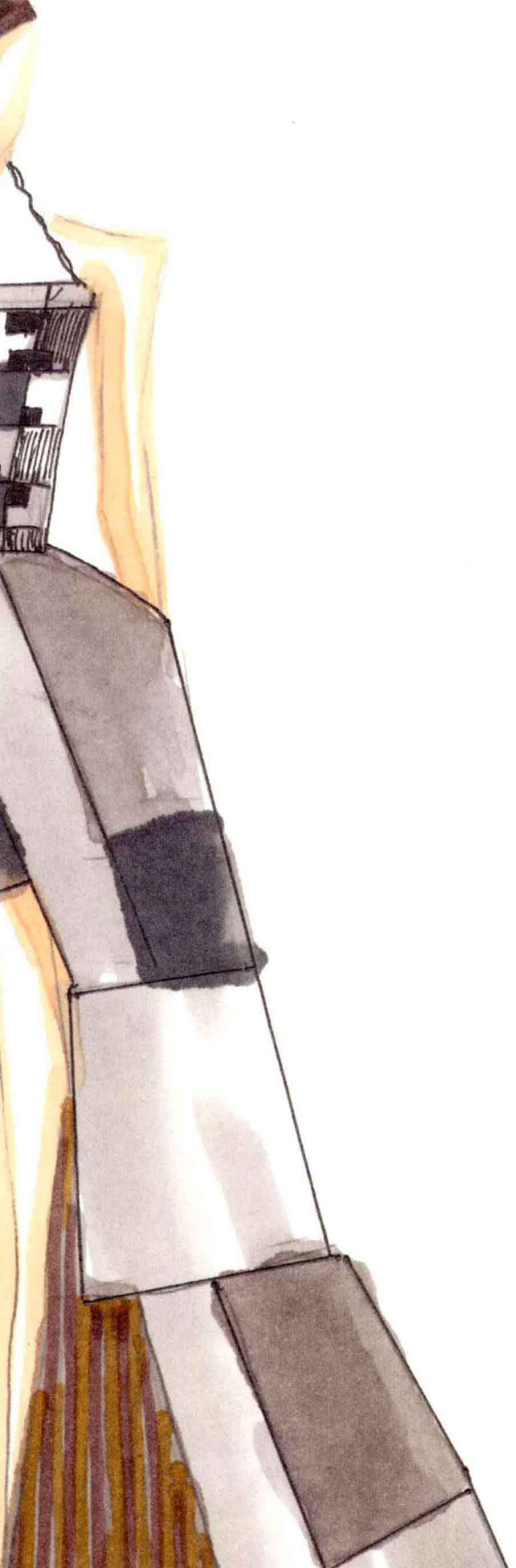


第一部分 PART 1

建筑玻璃“时装”历史

HISTORY OF GLASS "FASHION" IN ARCHITECTURE

在这里，我们一起来回顾一下建筑玻璃立面设计的历史，带领大家穿越时空，共同领略建筑“时装”的美，领略建筑“时装”设计师们的别具匠心，体味带有玻璃质感的建筑奇观。

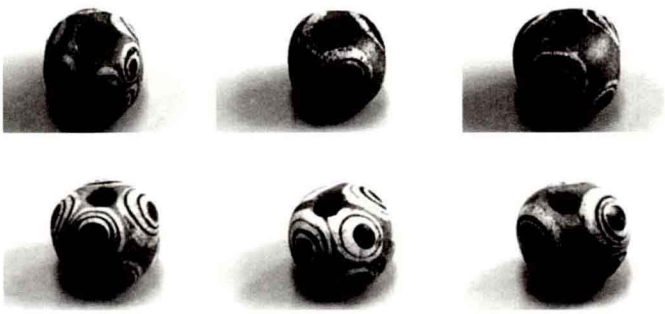
Here, let's look back over the history of glass façade in architecture, appreciate the magnificent wood "fashion" and the creativeness of architects, and enjoy the glass architecture wonders across time and space.

1. 古代

玻璃制造有着悠久的历史，关于玻璃起源时间的记载，文献上并不完全一致。这是由于学者对什么样的材料或制品才是玻璃的看法不尽相同，如果将陶瓷上的玻璃质釉也看做是玻璃，那么玻璃的起源时间就能追溯到公元前 8000 年左右。但如果将费昂斯（Faience，意译为釉砂）这种玻璃的雏形当成玻璃的话，则起源时间就较晚一些。有的学者认为在公元前 5000 年，亚述人便开始制造绿色不透明玻璃镶嵌物，之后传入埃及；公元前 4000 年至公元前 3000 年，埃及和美索不达米亚人均已开始制造玻璃；公元前 3800 年左右，埃及人制成“护身眼珠”的玻璃吉祥物，上面有黑条纹的装饰，可以说这是在玻璃史上最原始的装饰品。有的学者则提出，根据最早出土的玻砂（约在公元前 3500 年的美索不达米亚，即今天伊拉克部分地区），从而认为玻璃便起源于此。

公元前 11 世纪至公元前 8 世纪，我国西周的墓葬中出现了最早的玻璃；公元前 4 世纪至公元前 3 世纪，我国出现了在玻璃表面上镶嵌有几种不同颜色花纹的“蜻蜓眼”玻璃珠，与埃及的“护身眼珠”相似，但在由埃及传入的还是由我国劳动人民自己创造的这个问题上，学者们对此还有争议。

在古代，玻璃艺术品还是极为罕见的，那么穿着“玻璃时装”的建筑就不可能会存在了。



古代“蜻蜓眼”玻璃珠，中国，河南
ancient "dragonfly eyes", Henan, China

1. ANCIENT

Glass manufacturer has a long history. However, the records about the origin time of glass are different in many historical documents, as scholars hold different opinions about what material or product is defined as glass. If ceramic glaze is regarded as glass, the origin time of glass can be traced back to around 8,000 BC. If Faience is considered as the precursor of glass, then the origin time of glass is later. Some scholars believe that Assyrians started to make opaque green inlays in around 5,000 BC, which were later introduced to Egypt. Egyptians and Mesopotamians started to make glass during 4,000 BC and 3,000 BC. In around 3,800 BC, Egyptians made "wedjat eyes", a type of glass amulet decorated with black stripes, which can be considered the most primitive ornament on glass. As the earliest unearthed frits are thought to date back to 3,500 BC in Mesopotamia, part of which is now known as Iraq, some scholars believe glass originated from this area.

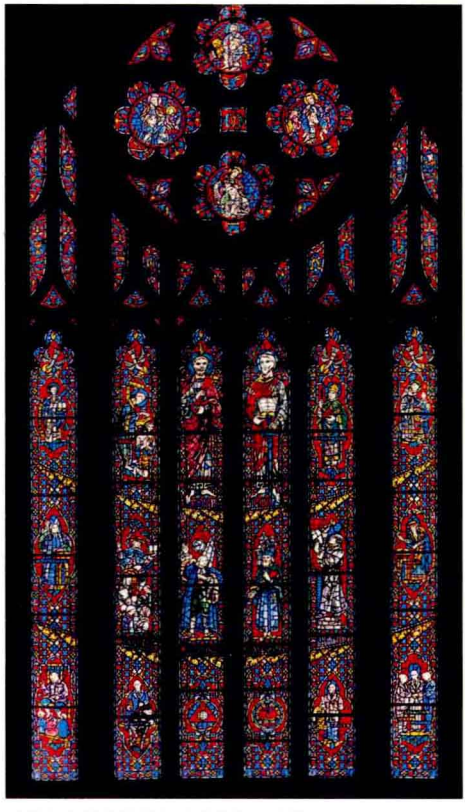
In China, the earliest glass was discovered in tombs during the Western Zhou Dynasty, from 11th century BC to 8th century BC. During 4th century BC to 3rd century BC, "dragonfly eyes" were made in China. They are glass beads, much similar to Egyptian "wedjat eyes", mounted with colored stripes on the surface. However, there are some disputes among scholars regarding whether they were created by Chinese people or introduced from Egypt.

In ancient times, glass artworks were extremely rare. Therefore, architectures in "glass fashion" hasn't appeared at that time.

2. 中世纪

在十二三世纪时期的欧洲，玻璃工艺还无法制造出纯净透明的大块玻璃，只能制造出面积较小、透明度很低及色彩偏暗的各种杂色玻璃。这种玻璃如果直接装在窗户上，必然会显得斑驳陆离、十分杂乱。于是法国人开始尝试在窗户上用玻璃来模仿自罗马帝国的艺术中传承下来的马赛克镶嵌壁画。即利用工字形截面的铅条，把按照设计图纸烧制裁好的各种形状及色彩的玻璃片拼接起来，组成画面。早期哥特式教堂中彩绘玻璃窗的玻璃片一般面积都比较小，色彩偏暗，而且人物也不高大，艺术风格上带有明显的来自于拜占庭镶嵌壁画的影响，但同时也显得整体色调比较统一、沉着，具有一种朦胧的神秘美感。

到了 13 世纪末以后，彩色玻璃的烧制工艺有了更进一步的发展，玻璃片的面积增大了，更加透明了，色彩也更加鲜艳起来。“在沙特尔大教堂的染色玻璃和 13 世纪后期教堂的染色玻璃之间便产生了深刻的变化……采用后一种玻璃装饰的教堂墙面逐渐融入到了缥缈的光线当中，因而它看上去似乎并不太像是用宝石马赛克进行装饰的……彩色玻璃制造技术的改进也同样反映出，人们希望通过增加透光度，来使更多的空间得以呈现。”由此可见，玻璃制作工艺的传承与进步，是使哥特式教堂彩绘镶嵌玻璃窗艺术得以产生并不断发展变化的重要条件。在中世纪一度出现了玻璃的繁荣，那是因为“中世纪哥特式风格的大师们试图用石头和玻璃来描绘人类的宗教核心问题”。由此哥特式彩绘玻璃窗出现并繁荣起来，成为人类艺术史上的一朵奇葩。



沙特尔大教堂的彩色玻璃花窗，法国
stained-glass window in Chartres Cathedral, France

2. MEDIEVAL

In 12th and 13th century, pure and transparent glass panes could not be manufactured in Europe due to low craftsmanship. There were only small pieces of mottled glass which have low transparency and dark color. If directly installed in window frames, they would undoubtedly look mottled and messy. Therefore, the French began to install glass in imitation of mosaic murals derived from the Roman Empire. By using strips of lead with H-shaped cross-sections, they joined together the glass pieces of various shapes and colors to form desired patterns according to the design. Consequently, the stained glass windows of the early Gothic cathedrals are usually in small size and dark color and the figures on the windows are not big either. Obviously, the artistic style was influenced by Byzantine mosaic murals. But at the same time, it took on a uniform color, presenting a sense of equanimity and a kind of hazy, mysterious beauty.

Since the end of the 13th century, the stained glass techniques had been further improved. The glass panes became larger, more transparent, and more colorful. There is a big difference between the stained glass of Chartres Cathedral and that of the churches built at the end of the 13th century. The latter made the church walls decorated with glass merge with illusory light, so it didn't seem to be decorated with stone mosaic. The improvement of stained glass techniques also reflected people's desire to present more spaces by increasing transparency. Hence the inheritance and improvement of stained glass techniques is an important factor for the origination and continuous development of stained glass windows of Gothic cathedrals. Glass was once prosperous in Middle Ages because the Gothic style designers, attempted to present the core of religion with stone and glass. The origination and prosperity of Gothic stained glass windows has become a unique miracle in the history of art.

3．近代与现代

虽然在漫长的中世纪，玻璃花窗一直没有离开过人们的视线，但将玻璃作为主要立面及幕墙用在建筑上，是近代以后的事情了。近代的玻璃立面建筑，比较有代表性的是水晶宫建筑。那是在 1851 年的伦敦首届世博会上，一座晶莹剔透且巨大恢宏的玻璃建筑横空出世。这座由园艺师帕克斯顿设计的展馆，占地约 64 750 m^2，长 606 m，宽 150 m，高 20 m，中间穹隆顶甬道高 35 m，巨大的钢铁框架由 30 万块玻璃覆盖。建筑通体透明，显得更加宽敞明亮。巨大的展馆大厅玻璃墙壁闪闪发光，就像在阳光照射下的水晶一样，故被誉为“水晶宫”。该建筑开启了近现代建筑的新时代。

玻璃是一种空灵通透的“无材料”，这和 20 世纪建筑师们对“虚无”的崇拜相符合。“纯净的玻璃盒子”建筑，完美契合了现代主义“少即是多”的建筑理念。“玻璃盒子”成为无数现代主义建筑的代名词。至此，传统建筑的风貌已逐渐被替代，世界各地的建筑便有了现在的样子。随着现代科学技术和玻璃技术的发展，以及人民生活水平的提高，建筑玻璃的功能不再仅仅只是满足于对采光要求，而是要具有能调节光线、保温隔热、安全（防弹、防盗、防火、防辐射、防电磁波干扰）和艺术装饰等特性。

随着需求的不断发展，玻璃在成型和加工的工艺方法方面也有了新的发展。玻璃在建筑中的用量迅速增加，成为继水泥和钢材之后的第三大建筑材料。

本书展示了近 20 个国际最新的玻璃立面建筑案例。在视觉感观上，这些“玻璃时装”堪比人类的丝绸时装，光洁绚彩、轻薄亮丽；在手法的运用上，涵盖时下流行的镶嵌、钢化、夹层、釉面喷绘、吹塑、模铸等多种技艺，更穿插了一些原创性的手法。这本书将为大家呈现一场别开生面的“玻璃炫彩时装秀”。

3. MODERN AND CONTEMPORARY

Although stained glass windows were very common throughout the long medieval time, it wasn't until modern time that glass was used in architecture as materials for façades or curtain walls. One of the representative architecture with glass façades is the Crystal Palace. In 1851, a glittering and grand plate-glass building was built for the Great Exhibition held in London. Designed by gardener Joseph Paxton, the great exhibition building was 606 m long, 150 m wide and 20 m high, covering an area of approximately 64,750 m^2. The path on the dome is 35 m high. The giant iron structure was covered by 300,000 sheets of glass. The whole building was transparent, splendid and spacious, with the glass walls glitter in sunlight like a crystal, thus earned the name "Crystal Palace". It started a new era for modern buildings.

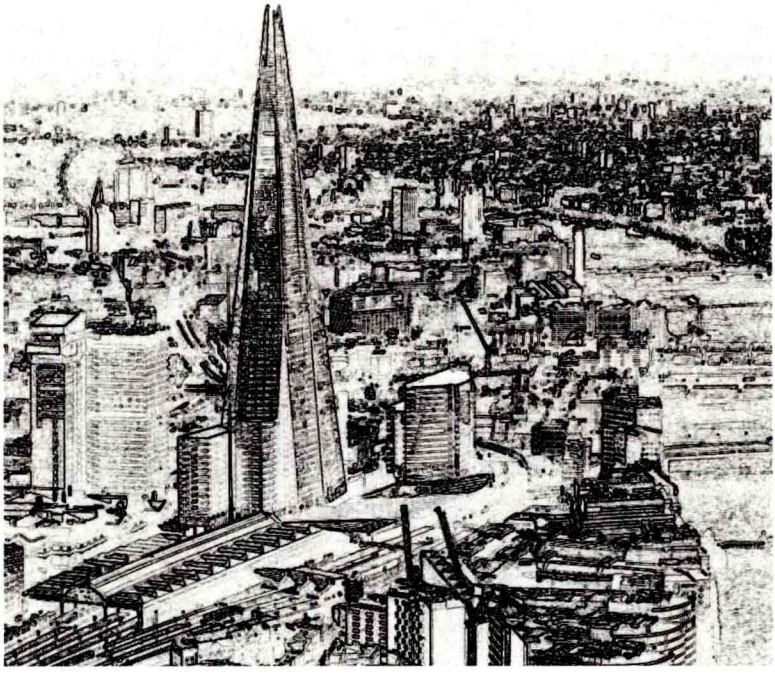
Glass is a sort of intangible, transparent "non-material", which corresponds to the architects' adoration for "nihility" in the 20th century. The pure box-like glass buildings perfectly correspond to the architectural concept of "less is more" of modernism. "Glass box" has become the synonym of countless modern buildings. Meanwhile, the styles and features of traditional architecture have been changed, and buildings have become what they look like now. With the development of modern science and technology, glass techniques and the improvement of living standard, glass in architecture shall not only allow for day lighting, but shall also provide various functions such as light control, insulation, security (fire-proof, anti-theft, water-proof, radiation proof, anti-electromagnetic), decoration, etc.

As the demand constantly increases, the shaping and processing techniques of glass have also been improved. Glass consumption in architectural construction has grown rapidly and glass has become the third-ranked building material following concrete and steel.

This book includes around 20 latest architecture projects around the world with gorgeous glass façades. Visually, these glass façades in architecture are as colorful, light, and graceful as silk garments. Technically, these façades involve many currently popular techniques such as inlaying, tempering, laminating, glaze painting, blowing, die casting and some original ones. This book will present a dazzling, unique "glass fashion show".

4．未来

在不远的未来，各种新式的玻璃将会进入我们的生活。新玻璃的成员有：打不碎的玻璃、可钉钉的玻璃、不反光的玻璃（光线反射率仅在1%以内，一般玻璃为8%）、防盗玻璃、隔声玻璃、真空玻璃、 智能玻璃（有高分子膜，其散光度、厚度、面积和形式都能由制造者自由选择）、全息玻璃（这种玻璃的窗户可将自然光线分解成光谱组合色，并将光线射向天花板进而反射至房间的各个角落）、调温玻璃（能在低温环境中吸收日光的热能，待环境温度升高后则变成不透明的白云色，并阻挡日光的热能，从而有效地起到调节室内温度的作用）、天线玻璃、薄纸玻璃（厚度仅为0.003 mm）、信息玻璃（能用于光电子学、生物传感器、计算机显示屏和其他现代技术领域的超信息玻璃）、排CO_2玻璃……这些玻璃进入我们的建筑领域，将真正改变我们未来建筑的面貌。



碎片大厦，英国，伦敦
Shard Building, London, UK

4. FUTURE

In the near future, various new kinds of glass will come into our lives. These new members include unbreakable glass, nail-penetrable glass, unreflective glass (Its light reflectance value is less than one percent vs. eight percent of common glass), anti-theft-glass, sound-proof glass, vacuum glass, smart glass (It has a polymeric membrane on it, and its astigmatism, thickness and size can be decided by manufacturers), holographic glass (It can decompose natural light into spectral colors, cast the light to the ceiling and then reflects the light into every corner of the room), temperature-control glass (It can absorb heat from sunlight in low temperatures and turn white and opaque as the temperature rises so as to block the heat, and in this way, the interior temperature can be regulated), antenna built-in glass, paper-thin glass (as thin as 0.003 mm), information glass (a hyper-information glass can be used in optoelectronics, biosensors, computer screens and other modern technology fields), carbon dioxide eliminating glass, etc. These types of glass will enter construction industry and change the outlook of architecture in the future.