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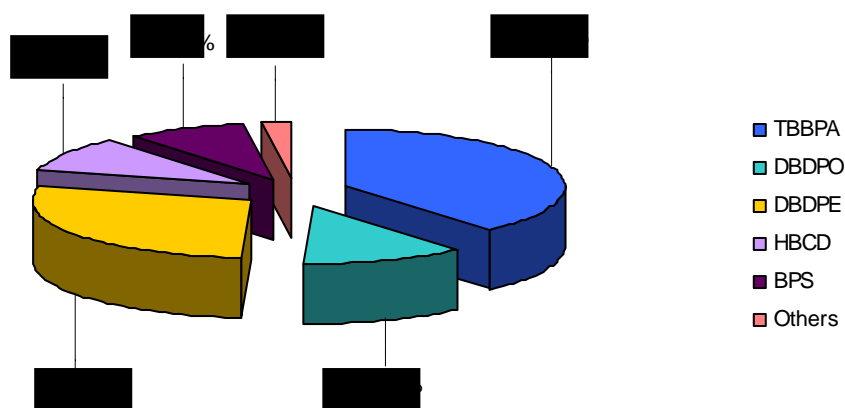
2 Overview of bromides in flame retardant industry

Brominated flame retardants (BFRs) are the major type of flame retardants by output and consumption in the world at present. In China, BFRs capacity in 2009, up to XXt/a, has doubled compared with XXt/a in 2006, and the output has increased to XX tonnes in 2009 from XX tonnes in 2006 with CAGR of XX%. Despite strong growth in production, the proportion of BFRs output in China's total flame retardants has reduced from XX% in 2006 to XX% in 2009.

BFRs have played the most important role in flame retardants industry in recent years, thanks to its notable advantages, mainly in low addition quantity and high flame retardant efficiency. Meanwhile there are no substitutes for BFRs for many downstream industries at present.

Although BFRs have been the leading flame retardant consumed in China for many years, its market share in total flame retardants is shrinking slowly due to its slowly decreased demand. Currently, with the safety dispute, the demand growth has gradually slowed down in recent years and no one plans to enlarge capacity or launch new production lines of DBDPO. It is expected that capacity of some new products of BFRs without safety dispute for the moment may enlarge in the future, such as DBDPE and BPS.

Figure 2-1 Share of bromine consumption in BFRs by product, 2010E



Note: the BFRs needing bromine consumption in traditional production exclude TBBPA-DBDPE and BEPO

Source: CCM International

3 Main applications in flame retardant

3.1 Tetrabromobisphenol A

TBBPA is the largest product in BFRs by capacity and output. There was no TBBPA producer in China, and thus its supply in China was dependent on imports before Shandong Senbo Chemical Co., Ltd. (Now Shandong Moris Chemical Co., Ltd.) launched a XXt/a production line in 2003. Since then, the capacity kept increasing year by year in China from 2003 to 2007.

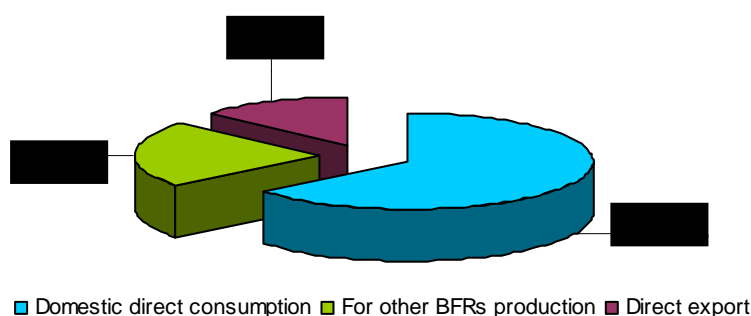
In recent years, TBBPA capacity has become surplus in China. Owing to growing concerns on product safety, overseas producers have reduced production. Meanwhile, global demand is still large, accelerating continuous capacity enlargement in China. With increasingly intense competition among domestic producers, less competitive producers have to quit from this field while competitive ones expand into development of downstream products, such as brominated epoxy resin.

Mainly applied in electrical and electronic products, TBBPA is one of the key flame retardants added in laminated wood of printed wiring which is made from epoxy resin, phenolic resin or polycarbonate. In addition, TBBPA is an intermediate of other BFRs such as tetrabromobisphenol A bis (2,3-dibromopropyl) ether (TBBPA-BDBPE). It can also be directly added into Acrylonitrile Butadiene Styrene (ABS) and High Impact Polystyrene (HIPS).

According to its consumption structure, TBBPA has broad market in electrical and electronic products such as mobile phone, computer, fridge, television, auto, etc. As its domestic market has been developing steadily and overseas demand for Chinese flame retardant products is enlarging year by year, and domestic demand keeps fast increasing.

Outlet situation of Chinese TBBPA, 2009

Figure 3.1-1 Outlet situation of Chinese TBBPA, 2009

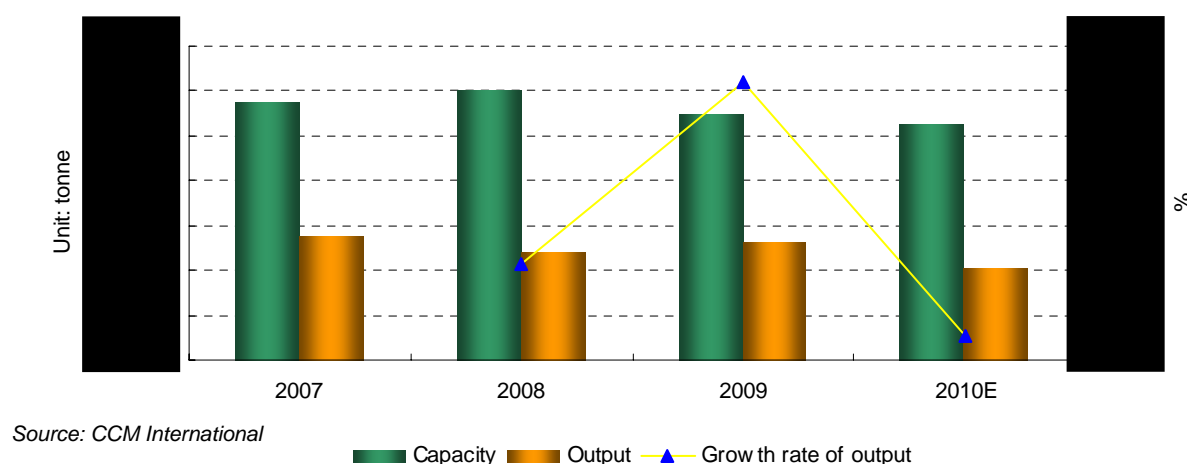


Note: Domestic direct consumption refers to the volume applied in domestic downstream industries.

Source: CCM International

3.1.1 Status of the tetrabromobisphenol A production in China

Figure 3.1.1-1 Capacity and output of TBBPA in China, 2007~2010E



Source: CCM International

3.1.2 Main producers of tetrabromobisphenol A in China

Table 3.1.2-1 Major TBBPA producers in China, 2010E

No.	Name	Status'10	Capacity'10, t/a	Output'10, tonne	Output'09, tonne	Quotation, USD/t
1	Shandong XX Ocean Chemical Co., Ltd.	Active	XX	13,000	XX	XX
2	Shandong XX Chemical Co., Ltd.	Active	XX	5,000	XX	-
3	Shandong XXr Sci.& Tech. Co., Ltd.	Active	XX	XX	10,000	-
4	Lianyungang XX Chemical Co., Ltd.	Active	5,000	XX	N/A	XX
5	Tianjin XX Hangu Saltern Co., Ltd.	Active	10,000	XX	N/A	XX
6	Shandong XX Chemical Co., Ltd.	Active	XX	2,000	XX	-
7	Shandong XX Chemical Co., Ltd.	Active	XX	XX	8,000	-
8	Shandong XX Jintai Fine Chemical Co., Ltd.	Active	XX	XX	2,000	XX
9	Jiangsu Suqian XX Fine Chemical Co., Ltd.	Active	2,000	XX	1,000	XX
10	ShandongXX Chemical Co., Ltd.	Active	XX	XX	800	XX
11	Shandong XX Industrial Co., Ltd.	Active	XX	XX	300	XX
12	Others	/	4,000	1,000	XX	-
Total		/	XX	XX	XX	-

Note: the quotations of bromine were given during 28th Oct. and 3rd Nov.

Source: CCM International

There are about 15 producers of TBBPA in China in 2010 and 11 of them are the major ones with the output of XX tonnes or more in 2010. Their total output has reached XX tonnes, accounting for about XX% of the total in 2010.