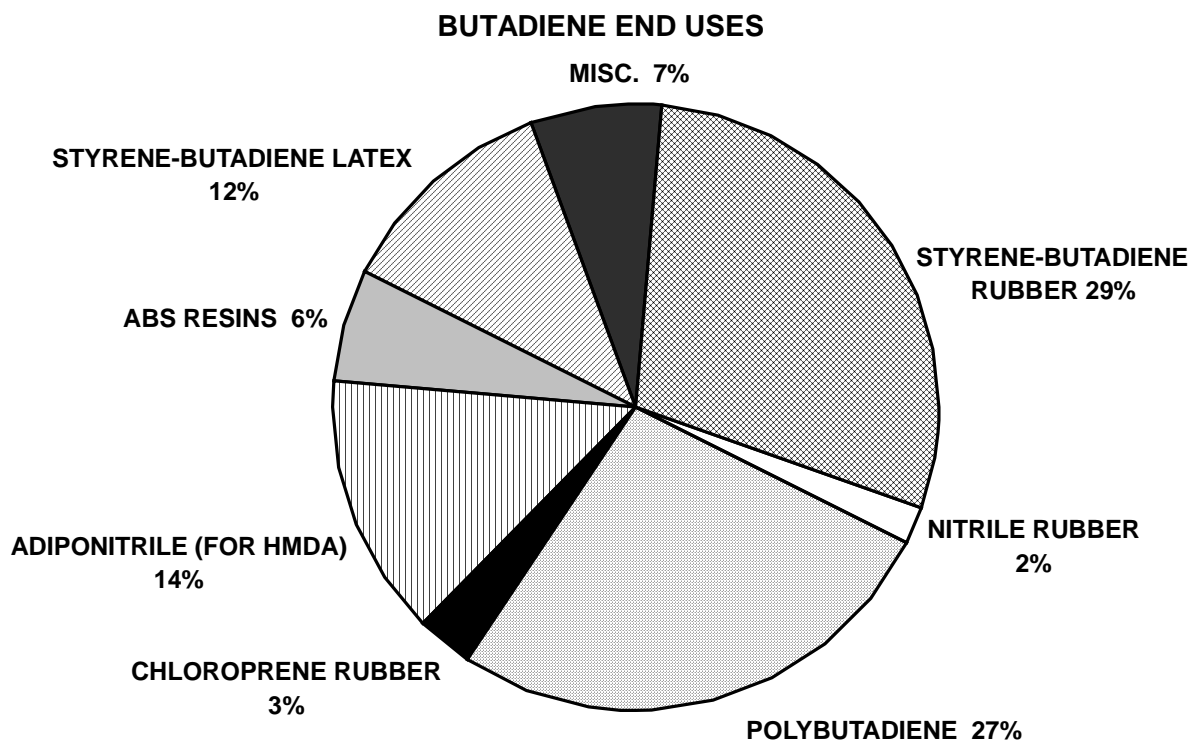


Chem Systems' Process Evaluation/Research Planning program has published a new report, ***Chemicals from Butadiene (99/00S13)***.

Based on its high reactivity, stemming from two double bonds, butadiene might be expected to be a valuable feedstock for making a variety of derivatives. However, with the important exception of certain synthetic rubbers and plastics, produced via free radical polymerization, butadiene is utilized surprisingly little as a feedstock for large volume chemicals production, despite its availability, relatively low price, and high chemical reactivity. The only chemicals of any notable volumes currently made from butadiene are adiponitrile (for hexamethylenediamine) via DuPont's elegant hydrocyanation process and Mitsubishi's 1,4-butanediol process which proceeds via oxidative acetoxylation. In total, non-polymeric applications for butadiene only compose about 20% of total usage, as shown in the figure below.



Over the last ten years there has been a lot of research activity devoted to developing new chemical process technologies using butadiene as the key feedstock. This effort is undoubtedly being driven by hopes of lowering production costs of existing large volume chemicals. Some of the research areas explored include:

- Butadiene to styrene
- Butadiene to caprolactam
- Butadiene to THF
- Butadiene to 2,6-dimethylnaphthalene
- Butadiene to 1-octene/1-octanol

Despite this research intensity, none of these processes have made it through to commercialization. It is likely, that although the chemistry and engineering efforts have been successful, the overall economics of the proposed process have suffered due to commercial issues such as the valuation/pricing of butadiene and sourcing of the large amounts required to support a world-scale butadiene based derivative plant.

The primary source of butadiene is from olefin crackers operating on naphtha feedstocks. Olefin plants produce a C<sub>4</sub> stream containing butadiene and isomers of butylene. The butadiene is recovered by extractive distillation and the butylenes fraction (raffinate-1) is used to produce gasoline or further processed into isobutylene and normal butenes for MTBE or chemicals production. (In some instances butadiene is produced on-purpose via butane or butene dehydrogenation.)

This new report reviews the conventional processes and economics for making butadiene and butadiene-based polymers and chemicals, and also examines some of the developing butadiene based technologies. The supply/demand forecast and markets for butadiene out to 2010 are also presented.