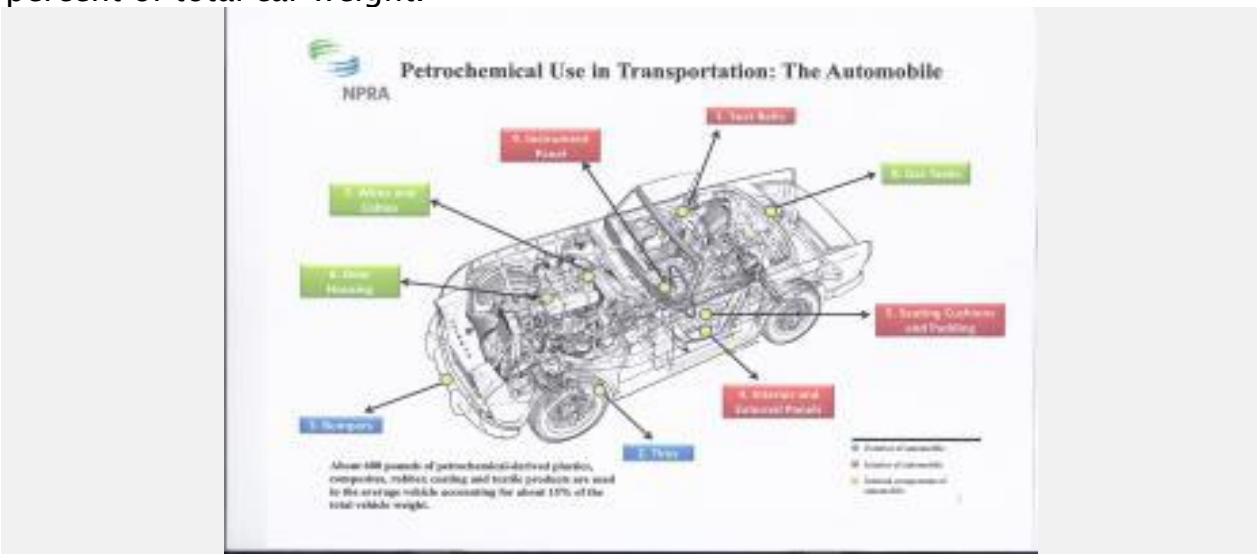
Car Must Become Lighter: A Chemical Opportunity

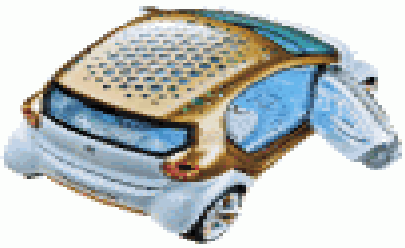
The government's recent proposal to raise the Corporate Average Fuel Economy (CAFE) standard to 54.5 miles per gallon by 2025 is too extreme to be adopted, but the figure will certainly keep rising to reduce crude oil consumption and the import of foreign oil. Plastic polymers, which weigh substantially less than steel or aluminum and have other advantages (e.g. easy molding, forming) have already made important inroads in automobile design, accounting for 15-20 percent of total car weight.



National Petrochemical and Refiners Association

Large, further reductions in weight will have to involve substantial use of graphic fibers and structural composites. This type of construction is now being used by Boeing and Airbus Industrie for their new, giant airplanes, such as the Dreamliner, to reduce weight while gaining structural strength.

The biggest problem facing car manufacturers looking at this material is its very high cost, currently over $ 100/kg versus $ 7/kg for steel. The current production process, based on polyacrylonitrile is very expensive. Nevertheless, several of the German luxury car manufacturers are well along in planning to use current resin technology for the composites, expecting that buyers will pay more for the cars.



BASF and Daimler concept vehicle

Given the high current cost for the raw material. an increasing amount of effort by private firms and by the U.S. government is being placed on developing much less expensive resins. DOE's Oak Ridge Laboratories is testing polyethylene-based resins, while a Weyerhaeuser joint venture is working on a process to use lignin - the part of wood that is not the cellulose used to make paper- as a carbon fiber precursor. No doubt, U.S. firms such as Hexcel and Cytec, who supply carbon fiber composites to the aerospace industry, are looking hard at the huge automotive market.

If carbon fiber and structural composites represent the future in transportation vehicles, a huge new industry making graphic fiber-based car parts will spring up to supplant and, in part, replace the current one. There is even talk of car engines made from graphite. Chemical engineers will be in the midst of such a transformation.

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