*About the Author:*

***Mr. Vineet Lohiya*** *is the Technical Head at* ***Rajasthan Detergent, Jodhpur****, a part of the Lohiya Group of Industries. He is a Chemical Engineer with a Master’s Degree in Polymer Science from* ***University of Manchester, U.K. under the world renowned Polymer Scientist Dr. Peter Lovell****. Apart from that he has worked extensively on fields on Water Based High End Adhesives, Coatings, Binders, Water Soluble Polymers, Detergent Polymers and Speciality Cleaners with following experts*

*1)* ***Dr Herbert ECK*** *(Germany) who has more than 100 scientific patents under his name*

*2)* ***Dr Laszlo Vegh*** *(Switzerland, Formerly associated with Harvard University and Dow Chemicals)*

*3)* ***Mr Peter Bakker*** *(The Netherlands, Formerly with Akzo Noble with 20 years of experience in development of Acrylic Resins, Urethane Resins etc)*

*4)* ***Dr Freiedrike Stollmaier*** *( Germany, Formerly with Dow Chemicals and University of Ulm)*

*5)* ***Dr Wolfgang Althoff*** *(Formerly Associated with Procter & Gamble).*

*He can be contacted at* [*vineetlohiya@rediffmail.com*](mailto:vineetlohiya@rediffmail.com)*. Or at +91-9828351025*

**ENRICHED WATER LESS ACRYLATE POLYMERS FOR DETERGENTS**

**Acrylic Polymers** have become essential ingredients of laundry products. They perform multiple tasks of inhibiting growth of Calcium, Magnesium Carbonate Crystals, does Sequestration, Help Soil Removal, Prevent Re-deposition of Dirt, Dispersing the insoluble clays and Prevent Encrustration on Clothes. The Acrylic Polymers make the detergent formulation stronger overall and more resistant to varying washing conditions and water hardness. Further they keep the fillers such as china clay , dolomite, calcite etc. in suspended form, thereby prevents them from deposition on the clothes/wares. So one can do away with the conventional CMC incorporation and save on that account. Improved performance can be seen by observing the cleanliness/whiteness not only in one wash but wash after wash.

This explains why world over Acrylic polymers are incorporated in detergent formulations by various multinational units. In India too because of its effectiveness at low dosages which brings economy to the formulation, it’s penetrating at a much faster rate.

Nonetheless, as they are all water based, they have more than 50% water associated with it, which results in unnecessary transportation cost from the supplier to the end user. Some small manufacturers also find difficulty in incorporating these liquid polymers particularly in dry detergent powders. The final moisture balance is also an issue in laundry cakes and dish-wash bars. These problems can be sorted out by changing the initial water content of the formulations. However, many detergent manufacturers in the unorganized sector find difficulty in changing the water contents.

Alternate solution exists in the form of spray dried polymers. Though, their usage is very limited because they are very expensive (High costs associated with spray drying) and are also extremely hygroscopic which makes them difficult to deal with.

The question arises whether can we get the benefit of both the worlds without increasing the formulation cost?

**Water Less Polymers or Polymers in the powder form are answer to these problems**.

Here the water content of the water soluble polymer is replaced by the same amount of inorganic chelating agent/builder. These can be Zeolite, Soda ash etc. which are invariably a part of all types of formulations. This makes the product 100% active since on top of the polymer, the formulator finds in the granule other ingredients which he is already using in the formulation.

**SYNERGISM**

To understand how a polymer has a synergistic effect with the inorganic chelating agent we take the case of Zeolite. Zeolite is an efficient builder for removing calcium ions hardness from the wash solution and one of the most widely used replacement of STPP. However, because it’s not water soluble, its diffusion rate in wash water is low compared to STPP. Poor dispersion of Zeolite therefore is a problem

It has been well established that Polyacrylates help and complement the sequestration job of Zeolite in detergents. Most of the synergism between the two species lies in a transport mechanism by which the polymer acts as carrier for positive ions and helps Zeolite to sequester, since Zeolite is in a separate phase(because of it non solubility) from the wash solution.

Secondly, polymers help with dispersing and suspending the insoluble zeolite in the wash liquor. Calcium sequestration studies have also concluded that the water less polymer does sequester significantly more calcium than the two ingredients (eg. zeolite + polymer) added separately

Thirdly, these water less polymers have a faster dispersion in water particularly in hard water compared to pure spray dried polymers.

**So water less polymers will surpass the performance of pure acrylic polymers or pure zeolite or pure STPP. In Liquid Polymers, polymer does crystal growth inhibition and chelation but its water content does not add to chelation. However in water less polymer, polymer will perform the same job of crystal growth inhibition and chelation and chelating agent available will add to the chelation value ie more sequestration amounting to better cleaning and whiteness index.**

**Speciality additives like the above are certainly the need of the hour in this competitive world where performance and economics both are equally important. Watch out for these range of polymers in the upcoming SCODET ASIA 2016 event where Rajasthan Detergent will be unveiling them.**