



SDI Review Form 1.6

Journal Name:	International Research Journal of Pure and Applied Chemistry
Manuscript Number:	2013_IRJPAC_7688
Title of the Manuscript:	COMPARISONS BETWEEN PVOH AND SDS AS SURFACTANTS IN NR/PVAc LATEX BLENDS
Type of the Article	Original Research Article

General guideline for Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty**', provided the manuscript is scientifically robust and technically sound.

To know the complete guideline for Peer Review process, reviewers are requested to visit this link:

(<http://www.sciencedomain.org/page.php?id=sdi-general-editorial-policy#Peer-Review-Guideline>)



SDI Review Form 1.6

PART 1: Review Comments

	Reviewer's comment	Author's comment (if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)
Compulsory REVISION comments	(1) <u>Page 4, line 89, equation (1):</u> $\eta_{rel} = t/t_o$ The equation is based on the assumption that very dilute solution is used where density of solution and solvent is nearly the same. The definition of relative viscosity (η_{rel}) is as follows: $\eta_{rel} = \frac{\text{Viscosity of dispersion}}{\text{Viscosity of water}} = \frac{C_{pt}}{C_{p_o t_o}} = \frac{\rho t}{\rho_o t_o}$ where C = calibration constant of the viscometer ρ and ρ_o = density of dispersion and water respectively t and t_o = efflux time of dispersion and water respectively Therefore, to obtain η_{rel}, the authors need to determine the density of dispersion. The density of water can be taken as 1 g/cc. (2) <u>Page 7, Figure 3; Page 8, Figure 4; Page 9, Figure 5:</u> For NR composition > 75 %, there is no crossover for 0.5 % surfactants (Figure 3). However, for 1 and 2 % surfactants, crossover is obtained (Figures 4-5). Explain the observations.	(1) The water dispersed latexes in the concentration utilized for this study in both case have values for density approximately equal to that of water. Hence, the relative viscosity was simply based on: $\eta_{rel} = t/t_o$ (2) From the results, the various factors deciding the change in viscosity of the blend systems are briefly summarized as follows: Adsorption/absorption of surfactants with the latex particles leading generally to viscosity increase;



SDI Review Form 1.6

		b. Ratio of NR to PVAc: the higher the ratio, the more is NR and hence more mobility with correspondingly decreasing viscosity. The lower is the ratio, the less is NR content, and hence less mobility with correspondingly increasing viscosity. c. The type of surfactant/latex combination: For example, NR/PVOH gives higher viscosity than NR/SDS, while PVAc/SDS gives higher viscosity than PVAc/PVOH. d. Dilution factor from water: Introduction of water decreases the viscosity of either PVAc due to plasticization or NR due to increased mobility. However, addition of water little reduces the viscosity of NR latex. For NR composition >75%, the content of NR is comparatively much higher than PVAc (only c.25%). Thus, the viscosity of the NR-rich blend will be predominantly determined and will experience unusual increase by PVOH which is responsible for the crossover with 1 & 2 % surfactants. With 0.5% surfactant, being very dilute compare to 1 & 2 % surfactants, the expected unusual increase in viscosity due to interaction between PVOH and the NR-rich blend is counterbalanced by dilution factor due to relatively high water content present in the dilute 0.5% surfactant. Thus, crossover could not be observed in this case.
--	--	--



SDI Review Form 1.6

Minor REVISION comments	(1) <u>Page 3, line 66-67:</u> What is the dry rubber content (drc) of the NR latex? <u>Line 68:</u> What is the molecular weight of PVOH? Molecular weight of polymer affects the viscosity of the dispersion. <u>Line 72-73:</u> In preparing the NR/PVAc blends, how do you ensure a good and homogeneous dispersion? NR latex is very sensitive to vigorous stirring. What is the mechanical stability time (MST) of the NR latex? (2) <u>Page 5, line 103-106; page 6, line 130-132:</u> The decrease in viscosity as NR component increases is attributed to “pseudoplasticity”. Pseudoplasticity is a phenomenon where the viscosity of fluid decreases when shear rate increases. However, the present study involves zero-shear viscosity. Therefore, the authors need to provide a plausible explanation on the above observation.	(1) The drc was deliberately left out of mention because only the total solids content (tsc), and not drc, was used in preparation of dispersion of the latexes. If drc of the NR latex was utilized for this purpose, then also dry polymer content rather than drc of PVAc would have been used. There is an intermediate step for stabilization of NR latex before mixing it with PVAc in order to achieve homogeneous dispersion. That stabilization process is not described as it is considered to be an information a patent now in process. Moderate stirring carefully arrived at by trial and error. The MST of the NR latex was extended due to the stabilization effect imparted to allow homogeneous blending. (3) Pseudoplasticity has two sides of interpretations. The first and common definition is the one you stated. However, the quality of rubber particles to exhibit Brownian motion (constant mobility) has equally been described as “pseudoplasticity” (Peethambaran <i>et al</i>, 1990).
Optional/General comments	(1) Error bars should be shown on the figures to show the significance of data.	(1) The viscosity of the dispersion was found to vary considerably between repeated runs. Hence, the first run was assumed to be true. Thus, repetitive runs requiring the calculation of standard deviation, and hence, error bars were not emphasized in the study.