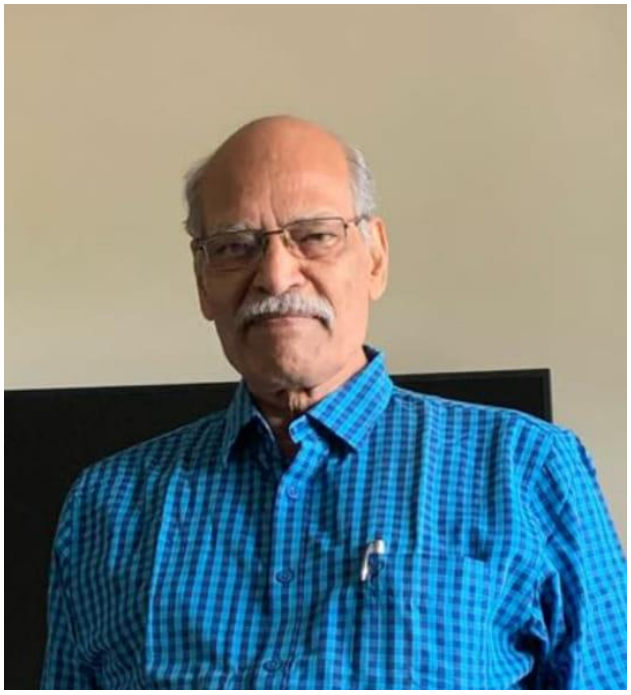
Bombay Technologist

INTERVIEW

An interview with Prof. Vinod Malshe

About Prof. Vinod Malshe:



Prof. Vinod Malshe completed his B.Sc from Vikram University Ujjain in 1966. He completed his B.Sc.(Tech) (Paints) from HBTI Kanpur and his M.Sc (Tech) from the University of Mumbai Department of Chemical Technology (UDCT) in 1972. He has also been awarded Ph D(Tech) in Chemical Technology from UDCT in 1975. After obtaining Ph D (Tech), he worked in the chemical industry in R&D for 18 years before joining UDCT (now ICT) as a Professor of Paint technology. (He was the first appointed professor of Paint Technology from inception of UDCT). After 14 years, he retired from the position of Professor of Paint Technology and Head of the Department of Surface Engineering and Technology at the Institute of Chemical Technology. He has been an expert consultant to various chemical industries. He has published nearly 50 research papers and authored 3 books and has over 14 patents to his name. He has been cited over 1300 times. He has been a member of several ISI (Indian Standards Institution) committees. He has guided 18 PhD from UDCT and 2 externally including one from Pakistan, and 12 Masters students' during his tenure as a professor and is on the editorial board of 5 international scientific journals.

1. What motivated you to become a professor at ICT? Did you always want to become a professor?

I never wanted to be a professor. I was literally forced into becoming one. In the hindsight, it turned out to be the best decision of my life. I was in Industry for over 15 years when the advertisement for the position of Professor of Paint Technology appeared in 1989. I was the General Manager of R&D in Ion Exchange India, leading a group of 40 scientists with an excellent track record of innovation, product development, new product introduction, problem solving in the plants, new design of water treatment equipment. Our R&D budget was about 3 crores per year. There was absolutely no reason to leave. I worked at Ambernath, had constructed a large bungalow at Badlapur, a 15 minute drive from my workplace. I was about 43 years old and had a reasonable career to look forward to. I was about 5 years old in the organization and had made a very significant contribution in new product development for water treatment, environment control technologies, catalysis, filtration, electro-chlorination, resin chemistry. A water purifier Zero B was developed in R&D with my significant contribution. The company also looked after well which was apparent from the increase in my take home salary. I had not even noticed this advertisement. Four persons motivated me to apply for this position: 1. Prof. K K Tiwari who was a consultant to M/S Dharamsee Morarjee Chemical Company at Ambernath and used to meet me often in the train. He was the first person to suggest. 2. I was a Masters and PhD thesis examiner and in one such examination, Prof. G D Yadav suggested I should apply. 3. Prof. M M Sharma asked me to see him. He told me that the position was being advertised and I should apply. I tried to tell him I was doing well, was a GM for 4 years and should get promoted to VP position any time. He told me that the position existed for

60 years and was vacant all these years. To establish the requirement of this position, he asked me to work for five years and I could leave if I did not like it. “Anyone will take you back in the industry”, he told me assuredly. If the position could not be filled up by a suitable candidate, it would lapse, he had added. The advertisement appeared. There were two positions: 1. Professor of Polymer Technology and 2. Professor of Paint Technology. I qualified for both. The application procedure was very tedious. Nine copies of the application in the supplied format with certified copies of all supporting documents were required. 4. My friend, Dr. D A Patil offered to make all 16 copies and submit it to the university, provided I gave him two first copies. Finally, this was done, I attended both interviews and was selected for Paint Technology. Because this position was being filled up for the first time, it required a lot of justification which was very ably provided by Prof. M M Sharma, and finally, the appointment letter was delivered to me in June 1993. I asked for 3 months joining period, a residence in UDCT campus. I was to lose 80% of my annual income (from ₹ 600,000 PA to ₹ 100,000 PA, with a deduction for house rent) because the salaries of professors in 1990s were very low. From the family front, it was a tough decision. Prof. M M Sharma had told me I could get good consultancy assignments from industry and the limit of fees was being revised from ₹ 150,000 per year to ₹ 450,000 per year. This happened within 15-20 days of my joining (3rd October 1993).

2. You have authored nearly 50 research papers. When did you write your first research paper, what topic was it based on and how did you get the idea to write that paper?

As a professor, I did not write a single paper myself. Communicating research work to an appropriate journal is a part of the training of PhD work. So, I used to insist that the student write the paper. I would do the corrections. My first PhD (Tech) student E. S. Sujatha completed her first scheme in about a year. This was on inorganic supported polymeric catalysts. The ion exchange resin catalyst that my group had developed in Ion Exchange had a temperature limitation (Max 130 oC). There were many reactions requiring a higher reaction temperature. Another limitation was the particle size of the ion exchange resin catalyst. Due to the inherent manufacturing process of suspension polymerization, the particle size ranged from 0.2 to 1.2 mm. This put serious limitations to the use of the catalyst as a packed material due to very high pressure drop and flooding problems. For processes such as the manufacture of MTBE, very special arrangements were required (packing in a bag of glass cloth, being practiced even today). I had figured out that we were entrusting the two activities namely structural stability and carrying the functionality both to the same polymer. Therefore, we had conceived an inorganic supported polymeric catalyst. Here the inorganic support was silica gel that could be tailored in various particle sizes, pore volumes, bulk densities that could reduce the pressure drop in packed columns. This was our first paper in collaboration with the Chemical Engineering department with Aspi Kolah and Prof. M. M. Sharma. This appeared in Reactive Functional Polymers.

3. What things do you miss about being a professor at ICT?

I miss my young friends most. By being in UDCT, I continued to feel young all my career as a professor. When I retired, I felt I was 25. I miss that closeness with young people most. Each year, the population was renewed. It does not happen in the industry. I have been working with some people for as long as 25 years now.

4. If you had to change something about ICT, what would it be?

ICT has existed for nearly 87 years now. Millions of new products, technologies have been invented, commercialized and have been established in this period by the chemical industry of the world. I can’t list a single product invented in UDCT or ICT in these years. Not a new polymer, a drug, a dye, a fibre, a new molecule that revolutionized the world, a new paint, new application technique, a new forming technique for polymers, a new dyeing method, a new dosage form that took the world by storm.

One major cause of this is the faculty does not collaborate. Pharmaceuticals, textile, need a multidisciplinary approach. With this in view, a special position has been created under the centre of advanced studies which had physics, dyes, polymers and textiles sections involved. This group has been receiving grants year after year. It was expected that this group would study dye fibre interaction, develop new dye molecules, new fibre forming polymers, studying their crystallography, dyeing characteristics. I do not think any of this has happened. What is more surprising, these sections have not published a single paper as a joint effort. Most faculties do not want to file patents. They do not know value of their research.

I visited Cambridge University while working with Ion Exchange. I was very surprised to learn that the university was self-sufficient in its requirement of funds. Most of the expenditure came from license fee and royalty earned on the inventions made by their different departments. Why in 87 years, UDCT or ICT could not become self-sufficient in its funding requirement? When we were constructing Hostel No. 5, the state government did not keep its promise and I remember the then director, Prof. J B Joshi had to get the funds from the industry. It is a heartening fact that past students from ICT occupying good position are able to contribute significantly and can influence industries to donate regularly.

5. What has been the most challenging time during your career? How did you overcome the challenge?

I had come from the industry, from a very senior management position. I had to seriously adjust to "requests" from my earlier privilege of "instructions". I could just tell my store clerk to order out something urgently required for research. This had to change to obtaining three quotations and order with the lowest quotation, wait for the supplies. This procedure delays progress. Typically, it slows down the work to about 1/3rd pace. I came to know over a period of time, that we had no medical cover of any kind. The day I realized this; I insured each member of my family adequately. The house in which I lived needed a lot of changes to make it liveable. The university system allowed only certain specifications decided by the engineer. I had to spend a lot of my own funds to make the house comfortable. It was painted with very dark colours. The floor was dark red and used to absorb all light. I could not convince the engineer to change the flooring. The house was, however painted as per the specifications of "Prof. of Paint Technology" with the right quality of paints and pastel colours.

I was warden of Hostel No. 1 for about 12 years and also Head Warden for about 5 years. Since I had lived in the same hostels as a student (1970-75), I could easily relate to problems I had faced. I introduced several firsts in administration, facilities to students. I allowed payment of fees by cheque much before UDCT did. This was done to avoid handling and mishandling of large amount of cash. I installed solar water heater for all toilets and also for the faculty living in that building, extended same to all hostels when I was head warden, provided best sports facilities like table tennis, carrom, pool table, projector for watching movies and sports events, carpet in the TV room, computers and internet for all students, a home theatre. (unfortunately, most speakers were stolen by the time I retired). I was first warden allowing entry of ladies to boy's hostel and use all facilities available there, only with one condition; They must be in a group of at least two. I used to see several ladies making good use of this facility. A popcorn vending machine, a deep fridge was also donated to help needy students and prevent residual food from spoiling and ice creams from melting. In difficult times, when we were constructing Hostel No 5, I increased the intake of the hostel by 66. This was done by increasing the beds by using two tier beds, converting an extra hall to three rooms to accommodate 6 students.

6. You have worked in the industry and have also been a professor at ICT. What made you transition from the academia to the industry?

I finished my PhD Tech from UDCT in 1975. I had worked with industry for about 1.5 years before joining PhD Tech. I joined the industry and from there I came to University. My total industry experience before joining UDCT was about 20 years. My academic stint was only 13 years and

six months. As I have said earlier, financially it was a bad decision. It continued to be that way. After my retirement, the pension was not enough to pay even the maintenance of my home in a cooperative society. For this reason, I had to work with the industry (which I am doing even now) even after retirement.

7. You have an experience of working with both, the academia and the industry. If you were to have completed your education in today's time, what would you prefer to join, the academia or the industry? Why?

Working in the industry, particularly close to the apex of the pyramid, is full of tensions. Performance is a very important criterion for continuation. There are fresh challenges, from juniors, horizontal colleagues and superiors. A significant effort is required to keep all quarters satisfied. The health issues for senior executives in the industry are much higher. When I was in the industry, several of my colleagues had to undergo heart surgery, some even died of heart failure, and not many of them have lived a healthy life. When I compare that with my colleagues in academia, practically no one had a heart attack or had to be operated, with exception of heavy smokers or those who had family problems. Most have a good health and live long. I would, therefore, again choose a combination of careers. Like in this birth, I worked 60:40 with industry and academics. The industry gives excellent training on various aspects of management, exposure to technology, business, international conferences, funds for research, and best of all: money. Now that the retirement age of professors has been revised to 62 and also 65, it leaves enough time for establishing a research group, the respect one gets in the industry is much higher because one does not talk only theoretical.

8. You have been listed as a noteworthy science educator and consultant by Marquis Who's Who. Please tell us about your success as an educator and consultant in the chemical industry.

I am not aware of this listing. I was generally a low key person. I never went to conferences to deliver keynote address or invited lectures. I loved to be with young people. Because of this opportunity of interacting with 14 batches of B Sc. Tech Paints & Polymer chemistry and B.Tech students, 18 PhDs (additional ones outside UDCT in Somaiyya College and another in Pakistan) and 12 Masters students' I have developed a great circle of young friends. I am on WhatsApp groups of several of them and exchange views on a daily basis. UDCT gave me the platform for industrial consultancy. There were restrictions such as only one working day per week, maximum fees I could charge, or only two clients at a time which had to be honoured. In Industry, I did not distinguish between disciplines. I worked with Pharma industries for process development, improvement in yield, problems relating to adsorptive separation, ionic separations, polymeric supports, formulations of completely new products, setting up of analytical facilities for the textile industry for exports, environmental issues in the petrochemical industry, recovery of valuable materials from waste streams, catalysis, adsorbents, printing inks, ballpoint pen inks and so on. Interestingly, I did not work for any paint industry. This was a conscious decision. As a policy, I have worked with one idea for one client only. If I was to work with one paint industry, I would have to unknowingly disclose the secrets of each other. Postretirement I have worked with 140+ industries. No two of them have the same business. If at all, I help them to complement their activities.

9. You have been a part of the industry for several decades. What has changed in the chemical industry since when you joined? What does it have to offer in the future?

Nothing seems to have changed. The local industry has no confidence in local developments. The Indian chemical industry does not spend adequately and does not believe in local innovation. A question that most decision-makers have asked me for which I never had any answer was, "If what you are saying is right, why others are not doing it?" I call it Macaulay effect (For those not aware, Lord Macaulay was a monster who destroyed the ancient Indian

education system, which our governments have continued even after independence). Our schooling education has been so designed that free thinking is just not allowed. The decision-maker, his assistants like advisor, finance, administration are trained exactly in the same way. I faced this as a researcher in the industry, as an employee and I face it even today with large organized industry. I can give several examples. While working for Ion Exchange, a public sector steel company asked the R&D, if we had a process to remove 1 ppm phenol from water. The stream , 700 m¬3 / hr emerged from the cocking plant. They had a biological treatment but wanted to evaluate alternatives. We developed polymeric adsorbents for removal of this trace phenol, its recovery at a very low capital cost and recurring expense. A proposal was made and was evaluated by the techno-commercial team. The commercial person asked, who else was using this technology. I had to tell them that the process was invented for them and there was no such plant operating anywhere else in the world. That was the end of the meeting. The finance man did not want to take any risk (Macaulay effect). The industry went ahead with their proposed biological treatment plant which cost them about 5 times more. After 35 years of this development 100s of small scale industries use this process for treatment of phenol bearing effluents. I am not aware if any steel industry has adopted this for coke oven gas scrubber effluent or quench effluent. There are two exceptions to this observation. Out of the two, in one unit I have been able to introduce several new formulations of ballpoint pen ink for a small scale industry, Smoothline Industry. The owner, highly passionate with new developments, introduces all the new ingredients I recommend, without asking why he should use it when others are not using it. Another company, NiChem solutions have so much confidence in my developments that 100% of the products they make, are developed by me. Some of these are for the first time in the world and several have been blatantly copied. (For example, a rodent repellent spray I made for automobiles called “No Entry” (see on Amazon) about 6 years ago, has nearly 25 copy cat manufacturers).

10. Your most cited article, “Non-isocyanate polyurethanes: From chemistry to applications”, has 235 citations. Please tell us more about it and also give us a few tips on writing a successful research article.

The article mentioned here is a review article. I have written only two reviews in my career. The other one relates to the permeability of polymers for coatings. This has 219 citations.

A review is a very challenging assignment. Several issues are important while choosing a topic for review. The following care should be taken:

a. The topic must not have been reviewed for at least the last 10 years.
b. It should be a relatively new promising technology
c. There must be adequate information for a review. It should be possible to review various aspects of chemistry, technology, environmental issues, availability of materials, manufacturing processes should be a part of a good review. It is desirable to cite 150-200 references.

I have written three books during my stay in UDCT. Two are textbooks of Paint Technology being referred by 11 institutes as textbooks of the subject. The third book relates to separation by membranes published by a German publisher (Lambert Academic Publishing). I do not think I could have done this if I had retired from an industry. For this, I am ever thankful to UDCT.

11. What words of advice would you give to young budding researchers to become successful?

1. Try to pick up a subject that has the potential to become a technology.
2. Do not work with illogical topics. For example, poly ethylene and poly ethylene terephthalate are very different polymers. There is no similarity beyond name. If you choose a problem to prepare blends of these two polymers, no success can be expected.
3. There should be as less published information on the subject as possible. I gave a topic of “polymeric pigments”

to a fresh researcher. He spent a month in the library and found no reference to it. I expected he would be very happy. Instead, he did not work on this subject. I gave him some other routine work.

If there are no references on a topic, it is good news. It leaves a lot of opportunity for fresh research.

4. Try and take up multidisciplinary research. There are better opportunities and possibilities for success.

5. Collaborate with more researchers. You stand a better chance of discovering something new.

6. Patent your developments before you publish new ideas.

I would like to see ICT getting so much royalty income from industry around the world that it does not require any external funding. I am sure every division of ICT is capable of achieving this target.

Areas such as energy, food, agro chemicals, special textiles are full of opportunities. I believe ICT has adequate talent to achieve this.