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### Summary of Qualifications

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- Highly skilled chemical engineer recognized for achievements in scientific research, product development and organizational skills, with 16 years of experience at a world-class research facility.
- Experience with aqueous electrolytes, properties of tropospheric and stratospheric aerosols, soil solutions, sorption processes, modern separation methods, instrumentation, statistical analysis and quality control.
- Adept at building teams comprising engineers, scientists and technicians to meet project objectives.

### Work History and Accomplishments

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#### 1985 to present **Oak Ridge National Laboratory, Oak Ridge, Tennessee**

##### **Engineering Science and Technology Division, Building Equipment Group**

- Solving applied problems related to electrolyte solutions encountered in the environmental, biochemical, chemical, electronic, and process industries.
- Effect of relative humidity, temperature, and composition on properties of tropospheric and stratospheric aerosols.
- Immobilized enzyme biosensor development.
- Using statistical methods applied to calibration and error structure of analytical instruments (relative and fixed bias detection, estimation and correction).
- Using statistical methods in data analysis, quality control, and statistical process control (SPC).
- Applying instruments such as atomic absorption (AA), spectrometers, gas chromatography (with electron capture, flame photometric, thermal conductivity and flame ionization detectors), high-pressure liquid chromatography (HPLC), and UV-VIS spectrophotometers for chemical analysis (including those used in the food industry).
- Predicting theoretical properties of aqueous electrolytes from dilute solution to molten salts.
- Physisorption and chemisorption processes.
- Using statistical mechanics and classical thermodynamics to obtain activities, partial, excess and integral properties of strong electrolytes in concentrated solutions.
- Developing software for product design.

### Education and Training

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Ph.D., Chemical Engineering, 1981, University of Pittsburgh  
M. S., Chemical Engineering, 1977, Illinois Institute of Technology  
B. S., Chemical Engineering, 1975, National College of Engineering and Technology, Pakistan

### Representative Publications

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- M. R. Ally, S. L. Clegg, J. Braunstein, J. M. Simonson (2001). Activities and osmotic coefficients of tropospheric aerosols:  $(\text{NH}_4)_2\text{SO}_4(\text{aq})$  and  $\text{NaCl}(\text{aq})$ . *J. Chem. Thermodynam* 33, No. 8, 905-915 (doi:10.1006/jcht.2000.0825)
- Ally, M. R. (2000). Liquidus Curves of  $\text{NaNO}_3(\text{aq})$  Calculated from the Modified Adsorption Isotherm Model for Aqueous Electrolytes. *Monatshefte für Chemie* 131, 341-344.
- Ally, M. R. (1999). Solute and Solvent Activities of  $\text{CaCl}_2(\text{aq})$  Solutions from the Adsorption Isotherm Treatment. *J. Chem. Eng. Data*, 44, 792-797.
- Ally, M. R., and Wills, K. J. (1999). *Analysis of Hydrogen Generation and Accumulation in U-233 Tube Vaults*. ORNL/TM-1999/188.
- Ally, M. R., and Braunstein, J (1998). Statistical Mechanics of Multilayer Adsorption: Electrolyte and Water Activities in Concentrated Solutions. *J. Chem. Thermodynamics*, 30, 49-58.

- DePaoli, D. W., Harris, M. T., Ally, M. R., Morgan, I. L., Cate, N., Ellis, M. E., Heath, K., Hovis, D. W., Kabalka, G. W., Anderson, C. L., and Tang, C. 1996. *Testing and Evaluation of Electrokinetic Decontamination of Concrete*. DOE/ORO-2036.
- Deorkar, N. V., J.-S. Lee, L. L. Tavlarides and M. Ally (1997). Adsorbents for Cobalt Separation from Aqueous Solutions. 10<sup>th</sup> Symposium on Separation Science and Technology, Gatlinburg, Tennessee, October 20-24.
- Harris, M. T., DePaoli, D. W., and M. R. Ally (1997). Modeling the Electrokinetic Transport of Sr and Cs Through a Concrete Disk. *Sep. Sci. Technol.* 32(1-4), 827-848.
- DePaoli, D. W., M. T. Harris, I. L. Morgan, and M. R. Ally (1997). Investigation of Electrokinetic Decontamination of Concrete. *Sep. Sci. Technol* 32(1-4), 387-404.
- Harris, M. T., DePaoli, D. W., and M. R. Ally (1997). Modeling the Electrokinetic Decontamination of Concrete. *Sep. Sci. Technol* 32(1-4), 827-848.
- Deorkar, N., Lee, J., Tavlarides, L. L., and Ally, M. R. (1997). Separation of Cobalt from Aqueous Streams Using Inorganic Chemically Active Adsorbents. AIChE 1997 Annual Meeting; Synthesis and Characterization of Novel Selective Ion Exchangers.
- Ally, M. R., and Braunstein, J (1996) A Comparison of Electrolyte Mean Ionic Activity Coefficients in Concentrated Aqueous Solutions as Calculated with Brunauer-Emmett-Teller Model and with Other Models. *Fluid Phase Equilibria* 120, 131-141
- Braunstein, J., and Ally, M. R (1996). On the Abraham Equation for Salt Activities in Concentrated Solutions. *Monatshefte für Chemie* 127, 269.
- Webb, O. F., Siegrist, R. L., Ally, M. R., Sanford, W. E., and Zutman, J. L (1994). In situ Treatment of VOCs by Recirculation Technologies. Proc. Am. Soc. Civ. Eng. National Council on Environmental Engineering (NCEE) on Critical Issues in Water and Waste Water Treatment, Boulder, Colo., July 11-13.
- Ally, M. R., and Braunstein, J (1993). BET Model for Calculating Activities of Salts and Water, Molar Enthalpies, Molar Volumes and Liquid-Solid Phase Behavior in Concentrated Electrolyte Solutions, *Fluid Phase Equilibria* 87, 213-236.
- Ally, M. R (1993). An Algorithm Based on the Irregular Ionic Lattice Model That Easily Predicts Properties of Aqueous Electrolytes from Dilute Solution to Molten Salt Regime. AIChE Summer Annual Meeting, August 15-18.
- Zaltash, A., and Ally, M. R (1992). Refractive Indexes of Aqueous LiBr Solutions, *J. Chem. Eng. Data* 37, 110-113.
- Ally, M. R., Klatt, L. N., Zaltash, A., and Linkous, R. L (1991). Densities and Refractive Indexes of Aqueous (Li,K,Na)NO<sub>3</sub> Mixtures. *J. Chem. Eng. Data* 36, 209-213.
- Zaltash, A., Ally, M. R., Linkous, R. L., and Reiner, R. H (1991). Effect of Additives on the Film Heat Transfer Coefficients of (Li,K,Na)NO<sub>3</sub> and LiBr Aqueous Mixtures. XVIII<sup>th</sup> International Congress of Refrigeration, Montreal, Quebec, Canada, Paper No. 52, August 10-17.
- Zaltash, A., Ally, M. R., Linkous, R. L., and Klatt, L. N (1991). Measurements of Heat and Mass Transfer Coefficients during Absorption of Water Vapor by Lithium Bromide and (Li,K,Na)NO<sub>3</sub>. Proc. Advanced Energy Systems Division, ASME Winter Annual Meeting, December 1-6, pp. 83-90.

#### Other Pertinent Information

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- Inventor of the Year Award, 2000
- *Discover Magazine* Award, 2000
- Technical Achievement Award, 2000
- Distinguished Scientist Award, 1998
- Technology Transfer Award, 1996
- Patent No. 5,294,357, M. R. Ally and J. Braunstein, 1994

#### Certification of Accuracy

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This resumé has been certified for accuracy by Moonis R. Ally on February 21, 2002, and by Jeffrey E. Christian, Center Director, ORNL Buildings Technology Center, on February 21, 2002.