In this issue

Non-metal chemistry

There has been tremendous recent progress in the chemistry of non-metal and main group elements. The ability of these elements to react in homonuclear (e.g. compounds with P–P, S–S, Si–Si or B–B bonds) or in heteronuclear (e.g. P–E, E = C, N, S or halogens) fashion has resulted in fascinating chemistry with a wealth of structural diversities. The chemical heritage of these non-metal and main group elements to interact with metals and non-metal elements has carried threads of research activity from the last century with burgeoning current and future interests. Low valent main group elements (e.g. P^{III}, As^{III}) possess lone pair of electrons and, therefore, are capable of interacting with transition metals to produce vast spectrum of coordination compounds. Studies toward the design and development of main group ligands of specific structural attributes (e.g. asymmetry) have assumed center stage of modern chemical research because asymmetric ligands can be used in enantioselective transformations.

The interplay of basic science and applied development has become the cornerstone of modern non-metal (or main group) chemistry research. Today, functionalized phosphines serve as vital building blocks for the construction of transition metal-based catalysts being used in the production of bulk/fine chemicals and pharmaceutical intermediates. Main group element ligands have also attained prominence in the constitution of transition metal (or radiometal) compounds for use in diagnosis and therapy of specific diseases in humans. Boron neutron capture therapy (BNCT) which uses water-soluble boron compounds for the treatment of patients with brain tumours has provided another example of the implications of basic research in non-metal chemistry for specific pharmaceutical development.

The special section **(pages 405–485)** provides an overview of the state of basic research in non-metal chemistry. The primary themes that characterize the articles are those of inorganic/organic chemistry of highly oxidized (and high coordinate) phosphorus compounds; organoaluminum fluorides, phosphonates and silicates as models for zeolites, rings and cages for new materials development; *de novo* design of air stable primary multinuclear phosphines and their implications in chemistry and biomedicine; new chemistry and structural diversity of boron compounds; chemistry and principles of reactivity in 'electron-rich' sulphur–nitrogen compounds; multifaceted aspects of phosphorus–nitrogen (PN) compounds; chemistry and development of polymer electrolytes derived from phosphazene compounds; and utility of cyclic and acyclic PN compounds as ligands for the construction of myriad of transition metal compounds. All together, we hope that we have succeeded in capturing some of the scientific excitement in a field that has been revitalized by its continued academic interest and significant commercial potential.

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Do Calcuttans have grimy lungs?

Among the many gifts of the Industrial Revolution is the menace of smog. Sir Arthur Conan Doyle, nearly hundred years ago, wrote about the fogs along the Thames in London. Public awareness about environmental air pollution heightened in 1952 after a large number of infants, young children and elderly persons died in London because of cardiorespiratory disease from air pollution. Later, similar episodes were reported from New York, New Orleans, Los Angeles, Tokyo, and Yokohama. Environmentalists think that atmospheric contamination is a twentieth century plague.

Oil refineries, paper mills, waste incineration and in cities, exhaust from motor vehicles are the predominant sources of both suspended particles and more than hundred noxious gases. In addition to the well-known consequences like ozone loss, acid rain and global warming, atmospheric pollution is harmful to human health. Epidemiologists have linked severe air pollution to the increasing prevalence of stuffy and running noses, chronic cough, asthma and indeed retardation of mental development in children.

Foul air is not a special preserve of the developed countries. More than three decades ago, M. K. Chakraborty and M. N. Rao reported a soot fall of 39.38–90.98 tons/sq mile/month in Calcutta (*Indian J. Med. Res.*, 1962, **50**, 295). The extent of air pollution in Calcutta was underscored by the study conducted by National Environmental Engineering Research Institute in 1968. They found that Calcutta air has 527 microgram/m^3 of suspended particulate matter.

The effects of air pollution on the health of residents of Calcutta are largely unknown. Whether the prevalence of respiratory disease in the city is high and whether lung function of the inhabitants of the city is compromised are yet to be assessed. T. Lahiri and colleagues **(page 399)** in a cross-sectional study conducted among the residents of different areas of Calcutta, find that sputum of dwellers in area of high

air pollution have abundant number of macrophages. Increased dust cells and eosinophils in the sputum reflect the degree of inflammation in the airways. In the lung, macrophages have the task of keeping the inner surfaces sterile and providing protection against invasive agents. The cells can also devour particulate material. A local increase in inflammatory cells can precede airway changes detected by lung function tests. Thus monitoring the number of inflammatory cells in sputum may be a good way to assess the early effects of air pollution. In recent times, measurement of serum concentration of complement components and sampling exhaled air for the level of nitric oxide have been recommended as biomarkers for objective evaluation of the early effects of air pollution. The technique used by Lahiri *et al.* is simple and yet another excellent screening method for exposure assessment studies.

A consistent accompaniment of chronic bronchitis is increase in the number of mucus-secreting glands in large airways. Would the counts of mucus-secreting cells in sputum also rise in pollution-exposed populations?

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