

Gian Paolo Chiusoli

At present a very active professor of Industrial Organic Chemistry at the Università di Parma, Gian Paolo Chiusoli was born in Treviso on June 7, 1923. In 1946 he obtained the Degree in Chemistry at the Università di Padova and then he joined the Istituto Guido Donegani in Novara, where he was Research Associate, Research Leader (1953), and finally Research Director from 1963 to 1975. In 1975 he accepted the call from the Università di Parma to take up his present position.

The scientific activity was divided chronologically into the two periods, one spent at the Istituto Guido Donegani, Novara, Italy and the other at the Università di Parma, but has always been homogeneously centred on metal-assisted organic synthesis, for which Gian Paolo Chiusoli has acquired a very high reputation worldwide.

Since the beginning of his scientific activity, Gian Paolo Chiusoli has been interested in the building up of organic compounds from small molecules such as carbon monoxide or carbon dioxide and unsaturated hydrocarbons, in the presence of an appropriate organometallic catalytic precursor. This is still, of course, a very active field of research. It was initially concerned with non-classical methods of forming new carbon-carbon bonds, the first industrial applications being the Fischer-Tropsch reaction, the hydroformylation reaction, discovered by Otto Roelen, and the chemistry developed by Walter Reppe in Germany. The chemo-, regio- and stereo-selectivity of any given process requires control of the sequential coordination of the reactive molecular fragments around the central transition metal atom and therefore understanding of the properties of both the metal atom and the ligand environment. This task often requires the organic chemist to work shoulder to shoulder with the inorganic chemist.

The first publications by Gian Paolo Chiusoli were a research paper [1] and a patent [2]: the former described the synthesis of carboxylic acids, esters and diethyl ketone from ethylene, carbon monoxide, and organic compounds containing active hydrogen, in the presence of cobalt catalysts, while the latter dealt with the preparation of naphthalene dicarboxylic acids. However, it soon became evident that carbon monoxide can also undergo addition to organic radicals with formation of carboxylic acids [3]. It was this radical-type reactivity of carbon monoxide which logically led Chiusoli to attempt the reaction of allyl chloride with carbon monoxide in the presence of a chloride scavenger: on the other hand, tetracarbonylnickel(0) proved to be the effective catalyst for, for example, the carbonylation of allyl chloride to give vinylacetic acid [4] or to give unsaturated carboxylic acids by sequential insertion of acetylene and carbon monoxide [5]. Furthermore, the carboxylation of organic substrates promoted by alkali metal phenolates was shown to yield carboxylic derivatives [6]; for example, camphor is converted into camphorcarboxylic acid with substantially complete selectivity.

Aromatization of methallyl chloride with acetylene and carbon monoxide to give *m*-cresol in the presence of tetracarbonylnickel(0) was achieved [7], as was the sequencing of two allyl halide molecules and double carbonylation to give alkenylsuccinic acids in the presence of tetracarbonylnickel(0) [8]. This research on the nickel-catalyzed reactions of allyl halides carried out at Istituto Guido Donegani and the initial period at Parma have been reviewed [9]. Among the metal-assisted coupling reactions of functionalized unsaturated hydrocarbons, mention should be made of the dimerization of acrylonitrile to adiponitrile [10]. Of the numerous sequential carbonylation reactions reported by Chiusoli and his coworkers, of particular interest is the synthesis of a carboxylic acid containing three cyclopentanone rings, obtained from *trans,trans*-1,5,9,13-decatetraene, methallyl chloride and carbon monoxide in the presence of tetracarbonylnickel(0) [11a]. A new technique, based on palladium-catalyzed decarbonylation, was also introduced; an example is the direct phenylation of methyl acrylate by decarbonylation of benzoyl chloride [11b].

Formation of C-N bonds from small molecular fragments, such as the nickel-catalyzed cyclo-dimerization of dipropargylamines and nitriles to dihydropyrrolopyridines was also accomplished [12].

Nickel, cobalt, palladium and rhodium are the metals, in the form of their organometallic derivatives, most frequently used for the construction of the organic molecules. Cobalt catalyzes the double annulation of 1,5-dienes with activated alkenes to give ultimately aromatic compounds [13]. Palladium is well known to catalyze a number of reactions important in organic chemistry; the problem of the oxidation state of the organometallic intermediate in some of these reactions has been addressed recently, and the first palladium(IV) alkylaromatic metallacycles have been isolated [14]. Chelation-assisted insertion also proved to be an efficient method for bringing about C-C bond formation [15].

These are only some of the scientific achievements by Gian Paolo Chiusoli and his coworkers. The influence of his background in Industry is clearly seen in his constant concern for combining sound fundamental research with the utilization of products for practical purposes; this has had a very positive influence on his accomplishment of new objectives. Since he began his academic activity in 1975 he has constantly maintained close contacts with Industry in the belief that, with the roles clearly defined, mutual interaction can be very fruitful.

Professor Chiusoli has had many coworkers both in Industry and at the Università di Parma. Many of these people have occupied or are occupying leading positions in industrial or academic institutions. He is an outstanding teacher: he is very keen on transferring his knowledge to his students in a manner adapted to each individual, taking personal features and inclination into consideration. His scientific curiosity has shown no decline over the years; for this reason his mind is fresh, and discussing Chemistry with him is a constant pleasure and always rewarding.

Professor Chiusoli is the author of more than 200 scientific papers and more than 100 patents. His scientific achievements have been recognized within and outside of Italy. He has been invited to deliver main lectures on many occasions in international conferences and meetings and he has taught in foreign universities, in the People's Republic of China in 1987 and in Brazil in 1988. He was a recipient of an award by Società Chimica Italiana for his research activity in 1972 and of a similar recognition by the Accademia Nazionale dei Lincei in 1984. He was elected a member of the National Academy (Accademia Nazionale dei Lincei) in 1988. He is a member of the Editorial Board of several scientific periodicals including this journal, and served on the International Advisory Boards of both the International Symposia on Homogeneous Catalysis (ISHC) and the International Conferences on Organometallic Chemistry (ICOMC).

Gian Paolo Chiusoli is a kind and cooperative person; his attitude is constantly aimed at recognizing the positive aspects of situations or people. He is thus an optimistic and enthusiastic person, very interested in his work and capable of transferring his enthusiasm to those around him.

The good response to the call for papers for this special issue of the Journal of Organometallic Chemistry dedicated to Chiusoli on the occasion of his 70th anniversary is the best proof of the esteem and reputation he has gained everywhere. I wish to thank all the contributors to this issue for participating in this scientific event.

I am sure all readers will join me and the Regional Editors of this journal in wishing Gian Paolo Chiusoli many years of successful and fruitful activity for the benefit of the scientific community.

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