Prof. Cyro Takano
Scientific Biography

Cyro Takano presents a synergy of academic and industrial activities Graduated in Metallurgical Engineering (1966), PhD at University of Sao Paulo. MSc in industrial engineering at Stanford University (USA), Pos-Doc at Tohoku University (Japan) and at Denver Research Institute (USA). Specialization on Management and Administration of research projects at Stanford University, Denver Research University and Vanderbilt University. This background gave him ability to apply fundamental and scientific knowledge for developing processes at industrial companies (Project coordinator at CBMM- Brazilian Niobium Company- and CEO of TECNORED -), and technological focus for academic researches. This approach gave him a good interaction with industry. He had been contributing as volunteer for many technical societies as member and coordinator of organizing committees of technical symposium and congresses, member of editorial staff, for government agencies as reviewer and for analysis and evaluation of research proposals. After retiring, he is still a full time volunteer at University of Sao Paulo with position of Senior Professor.

Research Activities (most of them as a part of the research group involving undergraduate, graduate students, engineers and other faculty members**):**

Raw materials processing: Contribution on understanding the fundamentals aspects of: iron ore sintering (PhD thesis); ore-carbon composite pellet and briquettes for innovation on self-reducing processes (like, TECNORED); charcoal making; and biomass processing for partial substituting of PCI (pulverized coal injection). International patent on production of FeNbC with fine NbC particles containing in an iron matrix and patent on pyrometallurgical concentration of niobium ore.
Publications: 22

Ore reduction and smelting (ferrous, non-ferrous and ferro-alloys)*:* This is his main competence, mainly on the phenomena involved (decrepitation, swelling, coalescence of metallic phase), behavior during reduction of ore-carbon and dust-carbon composites involving solid-solid, solid-gas and solid-liquid-gas phases. His research group at University of Sao Paulo is one with internationally recognized competence in this area, with contribution for more than 4 decades, to improve understanding and supporting fundamentals aspects of self-reducing processes for primary metal production (iron. tin, manganese, ferro-chromium). He has also contribution on Calcium and Magnesium production by silicothermic vacuum reduction.
Publications: 100

Metal refining. His contribution list on: pyrometallurgical refining of silicon, dephosphorization and desulfurization of steel, decopperization of Ferro-Nickel and high purity niobium production (Electron Beam).
Publications: 14

Environment, recycling, energy**.** Many research works on recycling dusts, slugs and solid wastes from metallurgical industries. Deserves to mention three important projects: zero solid waste program for integrated steelmaking and recovering of valuables metals from wastes generated at Electric Arce Furnace

Steelmaking and wastes from Nickel production (Caron Process). From 2010, his research group started a new program for supporting the national policy for CO_2 mitigation. This program complies for developing more energy efficient process for charcoal making and alternatives for using more biomaterial in metallurgical industries.
Publications: 60

Miscellaneous: He contributed with 11 publications on powder metallurgy (powder production and sintering) and 17 publications covering ferro-niobium characterization, carburizing processes, dissolution process of ferroalloys in cast iron and steel, and others.

Industrial Activities

***Project Coordination*:** At CBMM (Brazilian Niobium Company) he was involved on a first unit of high purity niobium production, in Brazil, and support for marketing development of this new product of the Company. This involved interactions with Universities, Research Institutes and other industrial companies. He was responsible for the coordination of more than 30 projects related with characterizations of niobium metal and oxide, and their potential uses**.**

TUPY TECNORED (Brazilian Process for Primary Metal production by Self-Reducing Process). He was the first CEO of the company, at the process-developing phase up to consolidation at pilot scale. At that time, the company was controlled by Tupy Corporation and now by VALE.

International Activities.

- Brazilian coordinator of Japan-Brazil Program on Dust Processing-Energy-Environment in Metallurgical Industries. He organized, together with Japanese coordinator, eight symposia (with proceedings) involving most of Japanese and Brazilian expertise working on this subject.
- IICSTI (International Congress on Science and Technology of Ironmaking). Member of the organizing committee, from 4^{th} up to 7^{th} (2014) and with special assignment as Director of International Committee at 6^{th} Congress, organized by Brazilian Association of Metals, Materials and Mining (ABM) in Brazil (2012).
- Advisory Board Member of the Seminar "Science and Technology of Innovative Ironmaking for aiming at Energy Half Consumption". Tokyo (2003), organized by Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan.

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Volunteer Activities

- At *the University of Sao Paulo*: After retiring (1997- present). Collaborator as Senior Professor at Metallurgical and Materials Engineering Department of the Polytechnic School.
- At the *Brazilian Metals,* Materials and Mining *Association (*ABM-Brazil): Regional Director, Member of Council and Member of organizing committee of the Annual Congress and of the Ironmaking Symposium... Editor of Reference Book.
- Cooperation with many national and Brazilian state agencies and some international (Norway Research Council) for analysis and evaluation of research proposals.
- Cooperation with many technical journals editors as reviewer.

Publications and supervising graduate students

- 217 technical publications (167in proceedings and 50 in journals); organized 6 books; 3 patents and 2 applied for.
- 25 technical report
- Supervised 19 graduate students.

Prizes and recognitions

- Vicente Chiaverini Silver Medal for relevant contribution in the area of Metallurgical Processing and 8 prizes for technical contributions, by Brazilian Metals, Materials and Mining Association.
- Cyro Takano Laboratory, at Federal University of Sao Carlos- State of Sao Paulo – Brazil.
- Honorary member of the Peruvian Association of Metallurgy, Materials and Mining.
- Recognition as one of faculty member with relevant contribution to Polytechnic School of the University of Sao Paulo in the book for commemoration of 120 years of the School. Publication by Escola Politecnica, 2013.