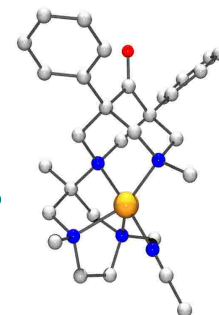


Analytical Chemistry | Technology Offer

Multifunctional Ligands for Separation of Metal Ions and Oxidation Catalysis



Innovation

Scientists of the University of Heidelberg have developed and synthesised a novel ligand system of the bispidone class.

With respect to their complexing properties, the bispidone chelating agents of the present invention are superior to conventional chelating agents in that they are not specific for only one radionuclide. Rather by selectively choosing appropriate functional residues the bispidone basic structure can be specifically customised to a variety of transition metals like Mn, Cu, Fe, Co, Ti, V, Mo, W, Tc, Re, In, Ga, or Y.

On the one hand the multidentate bispidone ligands are pre-organised due to their rigid and adamantan-like basic structure. But on the other hand their coordination sphere can also be kept highly flexible by modulating the pattern of substituents. Moreover, with help of the substituents the electron configuration of the respective transition metal complex can be controlled, for instance to influence the catalytic properties of the central metal.

Because of the cage-like structure of the ligands it is possible to generate highly stable complexes, which can also be easily immobilised to a matrix. This in turn renders them highly applicable to several applications, for example in analytical or industrial separation of metal ions.

Market

The bispidone ligands of the present invention allow the production of highly efficient metal complexes, which can be used in analytics, in chemical methods of synthesis, as well as for:

- selectively separating metal ions,
- reaction of organic compounds,
- use as radiopharmaceuticals,
- alkene oxidation or
- catalytic bleaching as bleaching agents.

Immobilised bispidone ligands can be used for the manufacture of manifold products, for example in ion exchange resins or in any other column, filter, or gel materials that are essential components in chromatographic methods.

Aziridination:

Transition metal complexes of the bispidones can be used as homogeneous catalysts. Aziridines, the N-analogues of epoxides, are produced during catalytic oxidation of alkenes and constitute an important group of substances in organic synthesis. The outstanding efficiency of a Copper(II)-bispidone catalyst according to the invention has already been demonstrated in reacting styrol, and many others wait for their announcement.

Advantages

- no limitation for any particular metal, but specifically adaptable system
- immobilisation to matrices
- hydrolytically stable ligands with outstanding complexing characteristics
- outstandingly high activity as catalysts for oxidation of double bonds (Aziridination)
- bispidone basic structure offers manifold options for connection of functional residues
- variability of the denticity of the bispidone ligand allows optimal complexing characteristics and opens a broad field of application

Technology Transfer

The Technologie-Lizenz-Büro GmbH has been charged with the commercialization and offers companies the opportunity to obtain a license to exploit this new and promising technology.

Patent Situation

- A German and an international patent application are pending.
- Use of bispidones for catalytic bleaching has already been licensed

Further information about "bispidon ligands":

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