


Slide N° 1

**Information Services in  
Chemistry**



Dr. Arnold Chemie-Beratung, <http://www.arnold-chemie.de>

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- What is scientific information?
- Who needs it?
- How is information going to help?
- Where can you get some?
- An eye on quality

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Claudia Arnold is a free lance consulting chemist, something inbetween an information broker and a consulting engineer.



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### What Is Information?

- Information  $\approx$  data
- Information  $\neq$  knowledge
- Information  $\neq$  automatic road to decision

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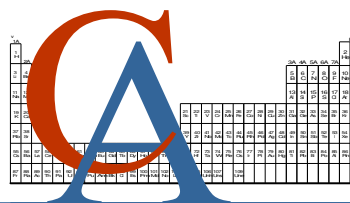
- In this context, „information“ is roughly defined by „data“. It does not yet mean that these informations have structure, context or meaning.
- Having retrieved information does not mean that you **know** something.
- Information alone does not aid in making decisions.

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### From Information to Decision

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- Information is what you get by retrieval from databases. Information is figures, publications, statistics etc.
- Knowledge is the result of a conceptual integration process, i. e. sorted, structured and interpreted information. Without information there can be no knowledge, if you are not in the esoteric arts.



- „Wisdom“ is the ability to look ahead to the consequences of all possible decisions and to make a choice. It is based on knowledge.

Information alone does not come to the point – someone has to supply the integration and the understanding.

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**The Process Starts with a Question**

- „How can it be done?“
- „Which material can we use?“
- „Is somebody doing it already?“
- „Will there be reactive hazards?“
- „Will environmental issues come up?“

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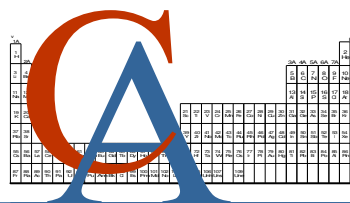
There are a lot of industries that from time to time have a chemical question or problem. These are mostly not dedicated chemical companies: The customers of a bakery are not the other bakers.

Rather, they are

- manufacturers of some kind or other, in my case mostly of technical equipment
- Consulting engineers
- And sometimes rather unexpected prospects, like advertising agencies or consulting companies.

From the ISP's point of view the process starts with a question from a prospect. Mostly these questions are asked only when problems appear and a (product development) process can not go on.

Let me show you some typical cases from my work. Some of these people only inquired after the worst came to the worst. Others – typically those that had big amounts of money to spend in one go – showed something like „information consciousness“ and wanted to begin their projects by building a solid knowledge base. Others, that will spend their money bit after bit – no matter how much it adds up to in the end – are less likely to start a project by gathering information.



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### Automotive: Cylinder Head Gasket Production

- No waste gas purification worked
- Residents complained



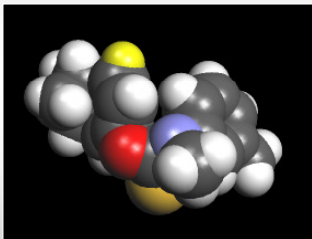
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Picture shows the inside of the blower from the oven where the raw gaskets are „baked“ (tempered). The inside – and virtually everything within a radius of 50 m around the oven and the stack – was covered with thick black layers of some greasy substance. The ovens themselves are no subject to authorization!

No filter, no waste gas purification method could be made to work.

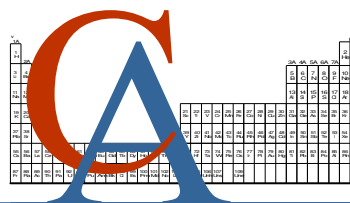
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### Pharmaceutical: Active Substance Vanished from the Market



- Production of antifungal substance stopped
- Small pharmaceutical company needs several kg

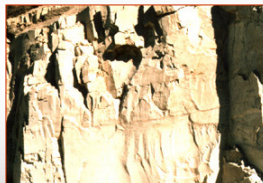
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## Natural Zeolites Market

- Land owner finds natural zeolites on his ground
- Is it worth mining them?

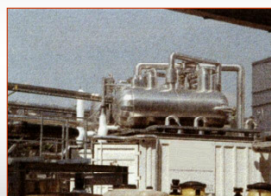


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## Synthetic Zeolites Market and Application

- Adsorbent in waste gas purification plant is to be changed
- Which one is the most (cost) effective?

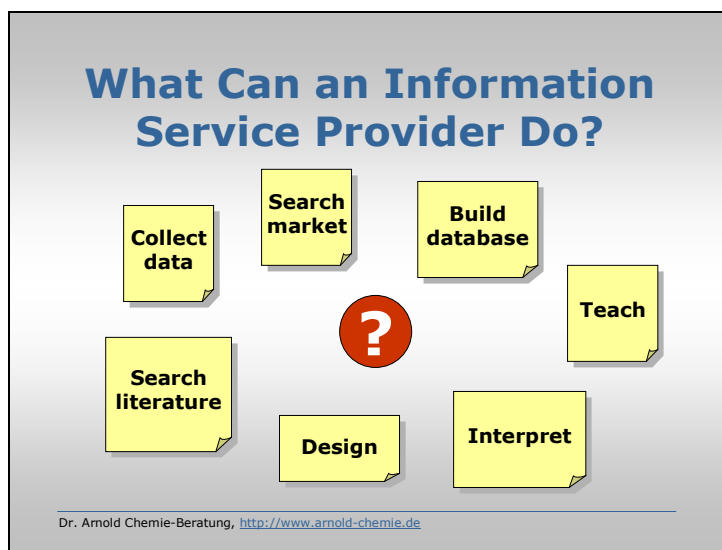


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The original adsorbent on which the plant design was based (Degussa DAY and DAZ) was no longer on the market. 6 to of synthetic dealuminated zeolite pellets cost approx. € 190.000,-



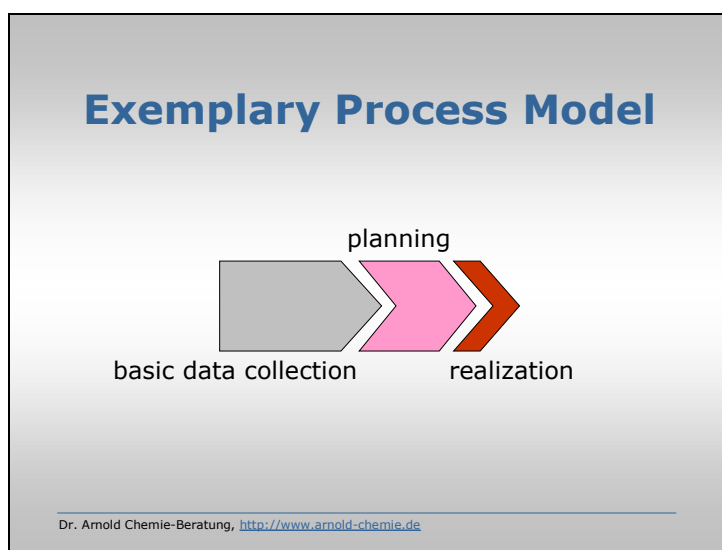
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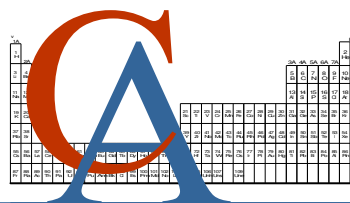


There is a number of activities a ISP can plunge into, or that can be required of him:

- Collect Data: Statistical data, material property data, measurements on pollution, ...
- Search literature: Like patents, publications, citations, technical papers, ...
- Search the market: find out prices, deliverers, specifications, market volumes, ...
- Build a database: compile everything in a structured form for the customer's later use, like in knowledge management
- Teach: e. g. teach the customer to do his own researches
- Interpret: Put the data in a scientific context, i. e. explain and apply what has been found
- Design: Make a draft of the plant, process or engine

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This depends upon upon which step of the process the ISP has to support:

- Basic data compilations?
- Planning and design?

The colour symbolizes not the amount of work to be done, but the concentration of knowledge and wisdom necessary in the process.

Remember the pyramid (slide N° 4):

- Does the ISP have to build the base? And if so, what is the customer lacking:
  - Capacities?
  - Information retrieval know-how?
- Does the ISP have to help in the processing of the data, too? Then he should be a scientist.
- When the ISP gets asked to supply the „point“, the decision, he is leaving the realm of ISP and becoming a consultant. The distinctions can be very vague.

I will show you some exemplary solutions.

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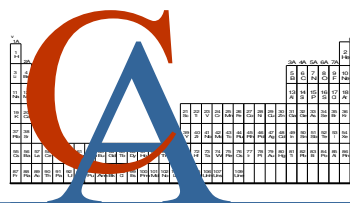
### Waste Gas Purification Method for Fatty Acid Aerosols

- Off gas analysis
- Design of waste gas purification method
- Market survey



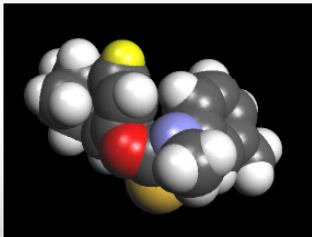
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Here, the simultaneous occurrence of aerosols and vapours had to be taken into account. This was a result obtained by knowledge and could not have been found by information alone. The rest of the work was pure information gathering.



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### Sourcing, Planning of Custom Synthesis



- Search in chemical market places
- Literature research
- Planning of synthesis
- Search for custom synthesis provider

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In this case, 5 – 10 kg would have been enough for a two years production. The former price was several 1000 \$/kg, but the final product (a foot powder) was very profitable, so it was worth looking into.

I looked into numerous exchange places for surplus chemicals, but could not find a single kg.

The customer wanted to check whether he could make the product himself. The patent had expired. I did a literature research on the synthesis to be able to collect quotes from custom synthesis providers. In the end, development costs proved to be very high for a product of only several kg/year.

The customer got a well-founded cost estimation upon which she could make a rational decision about the future of the product.

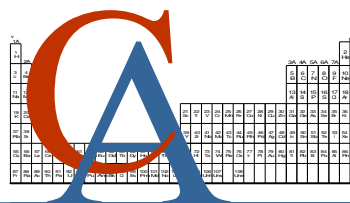
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### Exploitation of Natural Zeolite Site

- Analysis
- Market research
- Process description
- Search for specialists
- Potential customers
- Business plan



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This project started more or less with some pieces of rock being dropped at my door. The customer (land owner) needed a complete business plan to raise the necessary money. I supplied all the technical and scientific parts, including cost estimations and potential market volumes. I did this by desktop research and by talking to a lot of natural zeolite suppliers.

This project contained a lot of information providing, but was mainly about business building.

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### Market survey


- Comparison of available qualities and prices
- Search for adsorption data
- Analysis and regeneration of used material



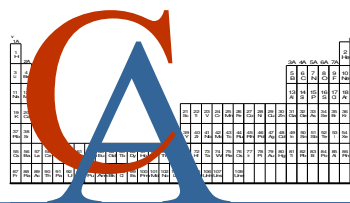
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### What Is Quality in Information?



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To many decision makers, working with an information service provider feels like opening a fortune cookie. They feel they never know

- What will be the results
- Whether there will be any
- Whether they will be helpful
- Whether they will be what they want them to be.

I heard statements from customers like:


- „Oh, we had this guy here, he built up an address database, but took everything from the yellow pages. He was no use at all.“
- „Yes, we had a literature search made, but the results were useless, nobody could do anything with them.“
- „No, we do not commission internet researches any more, it's all lies or assumptions what you find there.“

From the ISP's point of view, customers sometimes do not know what they want. I experience more vague, unspecific enquiries than well-considered ones.

Clearly, there is a communication gap to be bridged, otherwise the customer will never be satisfied, even if the ISP delivered exactly to his request.

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**A Useful Information Is...**



- Validated
- As complete as necessary
- To the point (helps in making the decision)

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**Validated:** The ISP has done his best to ensure that the information is correct and well-founded. Using last year's telephone books to build a marketing database clearly does not mean using validated information. Taking scientific information out of the usenet would be another example.

When planning an information retrieval project, it should be strictly agreed upon the permissible information sources, i. e.:

- Only scientific literature from peer-review-journals
- Primary literature only



- Only governmental or other official statistics

A good information service provider should be able to make some well-founded suggestions.

As complete as necessary: Completeness depends mainly on the databases searched. If you use an extensive database like Chemical Abstracts, there will be less information left out than when you search individual publisher's databases. Again, the information service provider should be able to give you educated estimations on the completeness of the data found by a search strategy. The necessary completeness depends on the application: a patent research must be much more extensive than corrosion resistance data.

To the point. Example: The German state of Brandenburg was planning to build a pyrolysis plant for automobile tyre recycling. The consulting engineers asked me to help them with the decision which pyrolytic process to implement. There are several processes to crack tyre rubber to oils, the products differ slightly, as do their potential applications, market value, plant investment costs and so on.

There is an Italian proverb that says: „Before you climb a ladder, make sure it leans to the right wall.“

There was no use in finding out all technical details about every process. The project was all about money: The decision would be based mainly on investment costs and the market for the crack products. These data were to be the central point of the research, supplemented by a rather short view on the environmental issues specific for the most favourable processes.

We held very long discussions before we agreed how to focus the research. If we had not done this, I would have delivered a vast pile of information with which would not have told the customer how to go on.

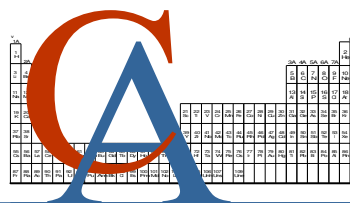
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## Services: Searching

- Information retrieval
  - Classical and internet-based
  - Patents and legislation
- Sourcing
  - Products
  - Experts
  - Services



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**Services: Thinking**

Consulting service in chemistry

- Zeolites market and application
- Environmental technology
- Chemical calculations

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This is a short list of services that I offer, and the logos of some of the organizations I am a member of (from top to bottom: DECHEMA e. V – <http://www.dechema.de> - GDCh e. V., the Society of German Chemists – <http://www.gdch.de> - and Science Consult KG, a network of scientific consultants – <http://www.science-consult.de>).

If you want to know whether I can help you with your information needs, contact me:

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- E-mail: [ca@arnold-chemie.de](mailto:ca@arnold-chemie.de)

I speak and write German, English, Croatian/Serbian and Italian.

I am looking forward to hearing from you!

*Claudia Arnold*

*This presentation was held at the AICHEM fair in 2006 in Frankfurt (Germany).  
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