Economic and Ecologically Favorable Destruction of Polyhalogenated Pollutants Using the DMCR Technology

(DMCR = Dehalogenation by Mechanochemical Reaction)

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By applying ball milling to contaminated materials and adding reagents (base metal, hydrogen donor), polyhalogenated pollutants like HCH, DDT, PCB, dioxin, PCP are reductively dehalogenated directly inside the contaminated matrix – virtually regardless of their state. A ball mill is used as a highly effective mixing device and a mechanochemical reactor in one single operation step simultaneously: The contaminated material is conditioned optimally, it is effectively mixed with the dehalogenation reagents, and the metal is dispersed and therefore mechanically activated for the dehalogenation of the pollutants.

Features and Highlights of DMCR:

- **Complete degradation of the pollutants directly inside the contaminated matrix at room temperature, ambient pressure and in a short time by reductive dehalogenation applying base metals (e.g. Mg, Na) plus an appropriate hydrogen donor.**
- **Well-defined, harmless and/or easier disposable and/or even profitably usable degradation products (e.g. PCBs yield biphenyl).**
- **Destruction of polyhalogenated pollutants both in liquid and solid-liquid and solid contaminated materials (e.g. mineral oils, sludges, soils) and of virtually pure toxic compounds or mixtures of it. Therefore high number of areas of application.**
- **Implementation on site or off site.**
- **No particular preprocessing.**
- **Economic/ecological benefits: Low energy costs, toxic compounds can be converted to usable products, reuse of scrap metals, detoxified materials can be recycled (e.g. transformer oils), no harmful emissions to the environment.**
- **Status: Feasibility studies and pilot scale projects, currently scaling up.**
- **More info: *www.tribochem.com***

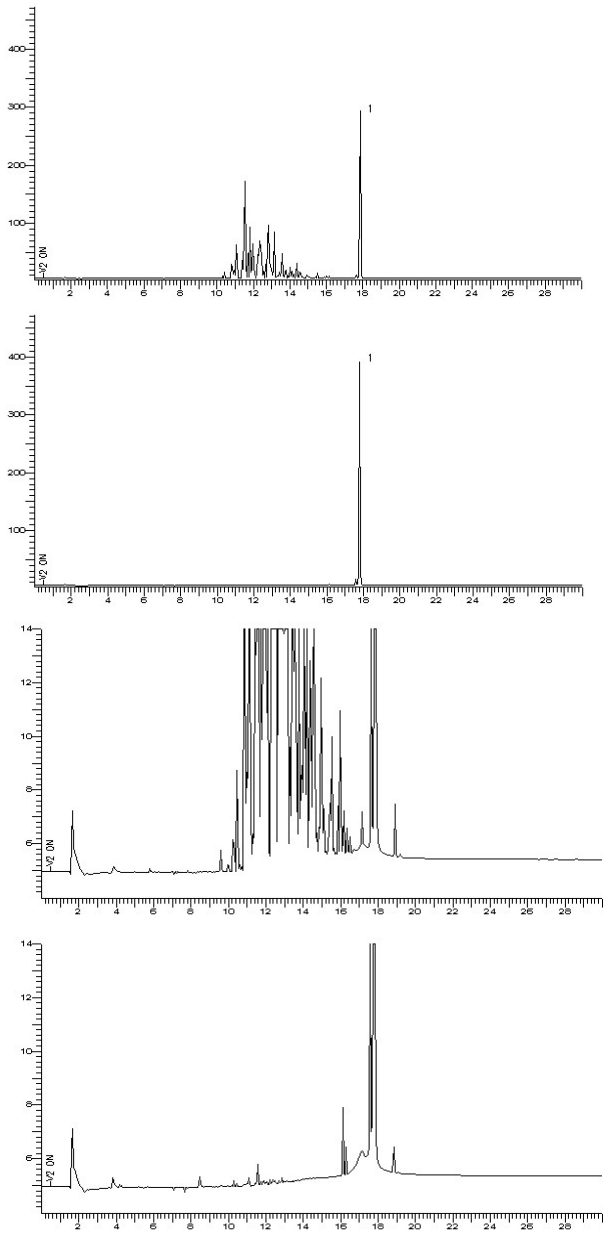

Fig. Gaschromatograms (detector: ECD) of a PCB contaminated soil (appr. 250 ppm PCB) ***prior*** to (at the top) and ***after*** PCB dechlorination (> 99.9 %, second image) directly inside the soil utilizing a vibratory mill and appropriate reagents at room temperature. High resolutions of these GCs displayed by third and fourth image, resp.

1 = decachlorobiphenyl (internal standard, contains 4 minor impurities).

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