THE TECHNOLOGIES AND THE POTENTIAL OF RECYCLING IN ROMANIA

Vasile HOTEA , Cezar TOADER, Nicolae BĂNCILĂ, Anamaria DĂSCĂLESCU, Radu COTEȚIU
North University of Baia Mare, Romania, Baia Mare 4800, st.Dr.Victor Babes NR 62A

Эта статья представляет общий краткий обзор прошлой и настоящей позиции ведущих предприятий относительно природоохранного законодательства и его влиянию. Ведущие предприятия достигли режима работы, который рассматривался бы недостижимым десять лет назад. Однако индустрия умела переживать этап постоянно увеличивающихся требований производителей, и пользователи должны были оценить их будущие позиции, так как значения стоимости законов окружающей среды имели существенное воздействие на их суть. Потребность знать существующее и предложенное законодательство имеет первостепенную важность.

This paper presents a general overview of the past and actual position of the lead industry in relation with the environmental legislation and its impact. The lead industry has watched environmental lead levels being steadily reduced down to levels that, ten years ago, would have been considered unachievable. Nevertheless, the industry has managed to survive the effect of the ever-increasing demands of producers and users have had to assess their future positions, as the cost implications of environmental laws have had a significant impact on their bottom lines. The need to be aware of the existence of new and proposed legislation is of paramount importance, as the thereat from the vast array of EEC Legislation is ever apparent.

Lead is a naturally occurring element and nature has evolved with mechanisms to cope with presence. A great deal is also known about lead from centuries of use and, indeed, this may largely be the reason for many present concerns. It has to be admitted that the lead industry has tended to project itself in a somewhat defensive way, particularly the last twenty to thirty years. I the last thirty years, there have been radical changes in environmental standards, which when taken on face value, were introduced to protect the general environment and, of course, the health and welfare of those occupationally exposed to lead.

There are, however, those who believe that many of these changes were designed to affect a "just – in case" scenario, in keeping with the example of asbestos. As such, there is a feeling that such impositions are somewhat unreasonable or unrealistic and an unnecessary drain on financial.

CURRENT ENVIRONMENTAL MONITORING AND CONTROLS

In general, throughout the world, industry is well regulated to protect both the workforce and the environment from exposure to lead. The extent of these regulations may wary according to advances is knowledge and developments in environmental control technologies. There is a result a general trend towards tighter standards as technical capabilities improve.

For those occupationally exposed to lead, it is generally accepted that good hygiene practices should be adopted, along with the overall aim to limit the amount of available lead-in-air in the breathing zone.

Although limit values for lead-in-air have been present for over the last 20 years, only in more recent years these standards been tightened. Occupational limit values are typically in the range 50-150 μ/dl. (Fig.1). Much speculation has developed over the importance of lead-in-air and any correlation in may have blood lead. As a result, air lead is perceived to be no more than am indicator of plant control.

As analytical methodologies have improved and legislation has forced down the acceptable levels of lead in-blood, today's levels have decreased to the range 10-70 μg/dl (Fig.2). Moreover many operating companies have been working with lower target levels than those currently require by law. The control of emission from industrial sources is also of vital importance. This includes air, water and waste streams. Although, over the years, concentration limits have been as high as 100 mg/mc, the industry is currently having to comply with standards as low as 1 mg/mc.

Other air parameters are also to be considered, i.e., boundary or ambient air leveles. Typical values used globally are in the range 1,5-2,0μg.m. Effluent plant discharges are usually designed to reflect best Available Technology for the process under scruting. Typical levels here would be applied in the range from as low as 0,1 to 3 mg/l. Lower levels be applied to some sensitive receiving matters, while the higher values related to sewers or main estuaries.

Tab1. Battery recovery in various OECD countries

Country	1986	1987	1988	1989	1990	1991	1992	1993
Australia					90			
Belgium	77				93			
Canada								
France	80			90				
Germany	83				>95			
Italy	83							
Japan	92	92,5	95	95	93			
Spain	83							
Sweden						>100		
UK	84					93	92	80
USA		88	91	95	97			>100

The disposals such wastes is carefully controlled under strict land conditions. The degree of hazard of this material be determined by lead content and the general stability of the waste, i.e. the leachability of any heavy meet that it may contain.

Standard leachate tests simulation land fill conditions may be applied prior to its acceptance particularly when a non-hazardous classification sought by the producer of this waste.

BATTERY COLLECTION

The European battery Directive has called for more formal methods of battery collection to be introduced in member states.

Although there have been collection screws introduces in Italy and Sweden, each country is being asked to design its own system. This may force a shift away from the more traditional routes of collection and place more emphasis on the battery manufacture to take in, and be responsible for, battery scrap [1], table 1. When lead metal prices are low, the smelter can only pay an appropriate amount for spent batteries based upon their metal content. Low scrap prices, and always will be, less attractive to those collection batteries, particularly when legislative requirements place a higher financial burden on collection and storage facilities. Having collected the lead/acid batteries, the merchant must transport batters in a responsible way.

Added to this, the merchant should also ensure the following [2]

- drivers are adequately trained to carry special wastes
- vehicles carry appropriate plating
- vehicles and containers are sound and leak proof
- documentation is complete and returned
- documentation is retained for up to 2 years.

Over the last seven years, for example, the actual recovery rates in the UK have been over 84% [3]. It is believed however, that in more recent years this level has increased to well over 90%, estimated to have been 95% in 2000, [4]. The recovery rates in the UK are amongst some of the best in the world.

CRITICAL ANALYSES OF THE RECYCLING PROCESS OF THE BATTERY SCRAP

The main deficiencies regarding the collecting and transport of the battery scrap are determined by:

- the lost of sulfuric acid, aprox. 5 kg/battery and the pollution of the soil and of the freatic waters on the entire territory [5]
- the lack of arranged spaces for storing collectors and beneficiaries, increases the pollution with sulfuric acid and lead compound
- the neutralization of the sulfuric acid in the unorganized system is practically unconceivable.

The dissemblage operation

Until now the following compounds resulted from dissemblage of the battery are not taken into account:

poly propylene
hard rubber
pvc scrap

The technologies and the potential of recycling in Romania

The potential production capacities of the lead production commercial societies are shown in the Table2.

Tab.2. Lead Production Societies in Romania

No.	Commercial Society	Town	Technology	Capacity (tones/year)
1.	RomPlumb S.A.	Baia Mare	WJ+RT 2	25 000
2.	Sometra S.A.	Copşa Mică	I.S.P.	40 000
3.	Neferal S.A.	Bucureşti	RT 2	34 000

From the presented data, we can see that, at this time, the entire base of material and, also, battery scrap can be processed in the existing production capacities, with the specification from the basic material related to the pollution problem, the transport of the material and the retailing of the product.

This analysis shows that this development can be accomplished at Sometra S.A. because:

- an unpolluted technology can be realized by the technological flux of processing interferating lead concentrates and zinc of the I.S.P. installation

- this platform involves the smallest effort of investment, having available locations and capacities, the supply with utilities, qualified work and a central geographical position.

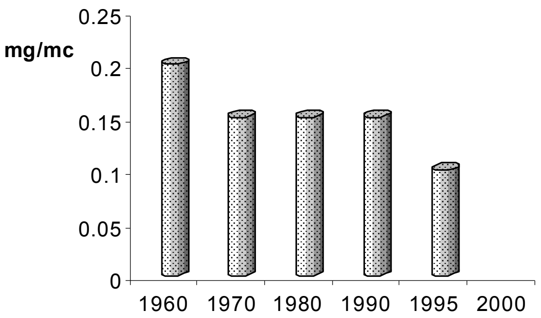

Fig. 1. Lead in air

It must be underlined that whatever the placement in the main preoccupations in accomplishing a new capacity are the pollution problems and the obligation to respect the limited internal standards and of the EU the evacuation of polluting factors in the environment.

Conclusions

The lead industry must decide its own fate in either accepting these change in environmental law or risk its future. Similarly, individual companies must consider their own policies and ask themselves it they intend to stay in business by investing in their plants and their employees.

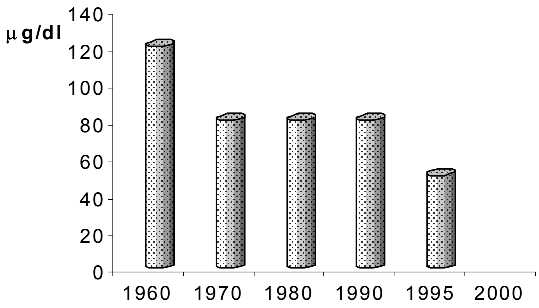

Fig. 2. Lead in blood

Most plants have not remained inactive and have interested wisely for the future by developing methods of reducing the exposure of their employees to lead. This will go a long way towards securing their futures.

Environmental legislation is often considered to be something of a nuisance it is vital importance however, that the lead industry is perceived to respond positively to the requirements of legislation. The global lead industry produces and consumes 4,5 million tones of lead per year [1]. This is a measure of the metal's importance to daily life. While this activity continues, lead must receive the credit that it deserves.

Lead is here to stay and workers in the industry need to believe in themselves and what the industry stands for in global society.

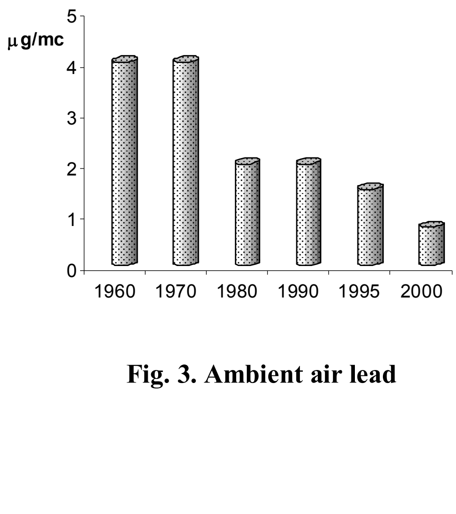

Fig. 3. Ambient air lead

References

1. *, International Lead and Zinc Study Group, Monthly Bulletin, July 1994
2. J.R. AILLEY, H. RIMMINGTON, Wasterman Seminar, Birmingham, UK 1994
3. D.N. WILSON, J. Power Sources, 42(1993) 319-329
4. *, International Lead and Zinc Study Group, Monthly Bulletin, September 1995
5. K.F. LAMM, A. MELIN, Beltrag zur Verhuttung von Akkuschrott, Erzmetall 33 (1980) 275-279.

УДК 547.21.057:546.11:546.262.3:542.97

СИНТЕЗ ВУГЛЕВОДНІВ З ГАЗІВ-ПІРОЛІЗУ МЕТАНУ НА МОДИФІКОВАНИХ Co-КАТАЛІЗАТОРАХ

М. С. Полутренко, П. Д. Романко

ІФНТУНГ, м.Івано-Франківськ, вул.Карпатська, 15

Изучены основные закономерности синтеза углеводородов из газов-пиролиза метана на модифицированных Co-катализаторах (вес.ч.): 64,5 CoO – 3,2 CuO – 32,3 алюминат кальция и 10Co – 0,4Pd/SiO_2. Полученный массив экспериментальных данных по превращению газов-пиролиза (содержание ацетилена 4–7 % об.) как базового сырья в смесь углеводородов на модифицированных Co-катализаторах указывает на возможность интенсификации процесса синтеза углеводородов, связанной с повышением производительности катализатора и суммарного выхода углеводородов на существующих мощностях промышленного производства.

Ключевые слова: синтез, углеводороды, газы-пиролиза, селективность, катализатор

It has been determined the main regularity of hydrogen synthesis from gases-pyrolize of methane using modificational Co-catalyst (weight part.): 64,5 CoO-3,2 CuO-32,3 with aluminate of calcium and 10 Co-0,4 Pd/SiO_2.

The obtained massif of experimental data for transformation of gases-pyrolize (content of acetylene 4-7%) as the base raw material in the mixture of hydrogen using modificational cobalt catalyst shows the possibility of intensification of hydrogen synthesis process connected with increasing of catalyst productivity and summary output of hydrogen using the existent industrial capacities.

Main words: synthesis, hydrogens, gases-pyrolize, selectiveness, catalyst.

При термоокислювальному піролізі метану при 1500^{0}С утворені гази-піролізу містять (% об.): CO-25,0-30,0; H_2 -50,0-55,0; O_2 -0,2-0,5; CO_2 -3,2-4,0; C_2H_2 -7,8-8,6; C_2H_4-0,3-1,0; CH_4 -3,0-6,0; N_2 -1,0-2,0; метилацетилен 0,001-0,017; пропадієн – 0,017-0,03; вінілацетилен – 0,014-0,03; дивінілацетилен – 0,08-0,19; бензол – 0,042-0,065; бутадієн – до 0,005, основними компонентами яких є CO і H_2, тому їх перетворення зводиться фактично до каталітичного гідрування CO за Фішером-Тропшом. Необхідно зазначити, що на сьогоднішній день гази-піролізу не знаходять кваліфікованого використання, а, в основному, спалюються на факелах, що призводить до забруднення навколишнього середовища.

Інтерес до процесу Фішера-Тропша почав відновлюватися в зв'язку з безперервним ростом цін та дефіцитом нафтових вуглеводнів. Основним недоліком даного процесу є низька селективність. Тому зусилля науковців в цій області сконцентровані на підвищенні селективності процесу з метою одержання високоякісної сировини для нафтової промисловості, а також на створенні модифікованих каталізаторів, які б давали змогу одержувати вузькі фракції вуглеводнів.

З каталітичним перетворенням газів-піролізу метану пов'язують вирішення ряду науково-важливих проблем, а саме:

- одержання багатотоннажних органічних напівпродуктів (етилену, пропілену);
- створення безвідхідних (екологічно чистих) технологічних процесів;
- відтворення сировини для органічнго синтезу.

В роботі [1] було вивчено перетворення газів термоокислювального піролізу природного газу в суміш вуглеводнів на промисловому каталізаторі Новочеркаського заводу синтетичних продуктів складу: (ваг.ч.): 100 Co – 6,2