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Scientific opinion on the safety and efficacy of aliphatic, alicyclic and aromatic saturated and unsaturated tertiary alcohols and esters with esters containing tertiary alcohols ethers (chemical group 6) when used as flavourings for all animal species

2014-02-04

Chemical group 6 consists of aliphatic, alicyclic and aromatic saturated and unsaturated tertiary alcohols and esters with esters containing tertiary alcohols ethers, of which 13 are currently authorised for use as flavours in food. The high use level proposed by the applicant for linalool (25 mg/kg complete feed) is safe for salmonids, veal calves, cattle for fattening and pets (excluding cats) without a margin of safety with the exception of dogs (SF 1.4). The safe use level for pigs and dairy cows is 20, for piglets 12 and for poultry 10 mg/kg complete feed. The high use level of 5 mg/kg complete feed for linalyl acetate, linalyl butyrate, linalyl formate, linalyl propionate, linalyl isobutyrate, terpineol, R-terpineol and terpineol acetate is safe for all species with a margin of safety of 1.2 to 12. For nerolidol, 2-methyl-1-phenylpropan-2-ol and 2-(4-methylphenyl) propan-2-ol, the maximum safe concentration is 1 mg/kg complete feed for pigs and poultry and 1.5 mg/kg complete feed for all other species. The absence of a margin of safety would not allow the simultaneous administration in feed and water for drinking of the following compounds: linalool, nerolidol, 2-methyl-1-phenylpropan-2-ol and 2-(4-methylphenyl)-propan-2-ol. No safety concern would arise for the consumer from the use of compounds belonging to CG 6 up to the highest safe level in feedstuffs for all animal species. All compounds should be considered as irritants to skin, eyes and respiratory tract and as skin sensitisers. All compounds of CG 6 are predicted to be safe to the soil compartment when used at levels safe to the target species. Using predictions based on chemical structure, 2-methyl-1-phenylpropan-2-ol and 2-(4-methylphenyl) propan-2-ol was estimated to be safe to aquatic compartments. In the absence of experimental data, safety to aquatic compartments could not be established for linalyl butyrate, linalyl isobutyrate, terpineol acetate, 4-terpineol, linalyl formate and linalyl propionate. Since all 13 compounds
Zinc oxide is a safe source of zinc for all animal species and no concerns for consumer safety are expected from the use of zinc oxide in animal nutrition, considering the maximum contents for total zinc in feeding stuffs set by EU legislation. Zinc oxide is not an irritant to skin and eyes; it is not a skin sensitiser. Zinc oxide has high dusting potential and inhalation affects the respiratory system. The authorised use of zinc oxide as a feed additive does not pose a direct concern for the agricultural soil compartment. However, there is a potential environmental concern related to groundwater, drainage and the run-off of zinc to surface water. Acid sandy soils are most vulnerable to these processes. In order to draw a final conclusion, some further refinement to the assessment of zinc-based feed additives in livestock needs to be considered, for which additional data would be required. The use of zinc-containing additives in aquaculture up to maximum authorised zinc level in feeds is not expected to pose an appreciable risk to the environment. Zinc oxide is efficacious in meeting animal zinc requirements.

Authors: Aquilina, Gabriele; Bach, Alex; Bampidis, Vasileios; De Lourdes Bastos, Maria; Flachowsky, Gerhard; Gasa-Gaso, Josep; Gralak, Mikolaj; Hogstrang, Christer; Leng, Lubomir; Lopez-Puente, Secundino; Martelli, Giovanna; Mayo, Baltasar; Renshaw, Derek; Rychen, Guido; Saarela, Maria; Sejrsen, Kristen; Van Beelen, Patrick; Wallace, Robert John; Westendorf, Johannes; Bories, Georges; Brantom, Paul; Chesson, Andrew; de Knecht, Joop; Gropp, Jurgen; Lundebuye Haldorsen, Anne-Katrine; EFSA Panel on Additives and Products or Substances used in Animal Feed FEEDAP.

Full Source: EFSA Journal [online computer file] 2012, 10(11), 2966, 24 pp. (Eng)
In this study, therapeutic effects and safety were investigated and 16 cases of pulmonary infection after kidney transplantation were divided into two groups. Twenty-eight cases were subjected to IVIG therapy for 7-10 days besides the standard specific anti-bacterial, anti-fungal, and anti-virus treatment and regular immunosuppressive regimen with dose adjustment (IVIG group), and the control group was only treated with standard specific antipathogen therapy. The incidence and mortality of severe pulmonary infection, levels of serum IgG, T lymphocyte subsets, and creatinine in the two groups were observed. The levels of serum IgG were significantly increased in IVIG group as compared with that before treatment and in the control group. There were no significant adverse reactions associated with IVIG infusion. The treatment reduced the incidence of severe pulmonary infection and mortality after kidney transplantation.

Authors: He, Juan; Xu, Da; Wang, Xiang-hui; Zhou, Pei-jun; Yang, Wan-hua

Full Source: Zhonghua Qiguan Yizhi Zazhi 2012, 33(12), 721-724 (Ch)

Optimising outcomes for patients with newly diagnosed multiple myeloma eligible for transplantation

2014-02-04

High-dose therapy with autologous stem cell transplantation (HDT-ASCT) has been considered to be the standard frontline treatment for younger, fit patients with multiple myeloma (MM) since the 1990s. Efforts continue to optimise the use of HDT-ASCT with the aim of improving outcomes. One strategy has been the incorporation of novel agents (thalidomide, lenalidomide and bortezomib) in the pre-transplantation setting as an induction therapy or in the post transplantation setting as a consolidation or maintenance therapy. Given their high response rates, three-drug induction therapy regimens (for example, bortezomib-thalidomide-
dexamethasone, lenalidomide- bortezomib-dexamethasone and cyclophosphamide-bortezomib- dexamethasone) are now the standard of care. Thalidomide and bortezomib are well suited for consolidation therapy, and regimens using these agents can improve the depth of response following HDTASCT. Lenalidomide is particularly well suited for long-term maintenance therapy following HDT-ASCT, and initial results are promising and have shown improvements in disease outcomes such as progression-free survival and overall survival in some cases, although a low incidence of second primary malignancies have been observed. Further studies are needed to determine the optimal regimen and duration of induction therapy, the impact of maintenance on overall survival and the safety of long-term treatment. Many of the studies currently underway in MM will help address these aspects.

Authors: Moreau, P; Touzeau, C.

Full Source: Leukemia Supplements [online computer file] 2013, 2(S1), S15-S20 (Eng)

Efficacy and safety of monotherapy in bipolar depression: a systematic review.

2014-02-04

The treatment of depressive episodes in bipolar disorder (BD) remains a challenge for clinicians and is a hot topic in current psychiatric practice. The present review focused on efficacy and safety of monotherapy in order to identify published randomised double-blind trials and open-label trials, written in English, reporting the outcome of fluoxetine treatment in depressed bipolar patients. Pubmed was searched to identify published randomised double-blind trials and open-label trials, written in English, reporting the results of fluoxetine treatment in depressed bipolar patients. The following key words were used: fluoxetine and bipolar and depression and treatment. Seven prospective studies (four randomised clinical trials and three open-label trials) and one two-phase retrospective study were reviewed. Fluoxetine showed to be efficacious in bipolar depression, confirming its well-known activity in major depressive episodes, with a low percentage of mood switch, despite the general view that antidepressants may increase the rate of manic/hypomanic episodes in BDs. More studies
The pharmacokinetics, safety and tolerability of a single oral dose of desvenlafaxine were assessed in healthy adults stratified by age.

Effects of age and sex on the pharmacokinetics, safety and tolerability of oral desvenlafaxine in healthy adults

2014-02-04

Desvenlafaxine (administered as desvenlafaxine succinate) is a serotonin-norepinephrine reuptake inhibitor approved for treatment of major depressive disorder. Because it is primarily eliminated unchanged by renal excretion, it is important to characterise the effect of patient factors, such as age and sex that may influence renal clearance. The pharmacokinetics, safety and tolerability of a single oral dose of desvenlafaxine were assessed in healthy adults stratified by age (young, 18-45 years; elderly, 65-75; very old, >75) and sex in an open-label, inpatient trial. Desvenlafaxine was generally well tolerated and was slowly absorbed in all age groups. Mean values for peak plasma concentration (Cmax) for women exceeded those of men and women had a shorter time to Cmax. Compared with young participants, mean total area under the plasma concentration-versus-time curve (AUC) and Cmax values were 55% and 32% higher in very old participants, respectively. These differences were largely driven by decline in renal function. There were small to moderate pharmacokinetic differences with oral desvenlafaxine across the age and sex cohorts; however, the magnitude of the differences do not warrant specific dose adjustments based solely on sex or age. The possibility of reduced renal clearance should be considered when determining the dose for patients aged >75 years.

Authors: Nichols, Alice I.; Richards, Lyette S.; Behrle, Jessica A.; Posener, Joel A.; Fruncillo, Richard; Paul, Jeffrey

Full Source: Journal of Bioequivalence & Bioavailability [online computer file] 2013, 5(2), 88-94 (Eng)
Technical

Efficacy and safety of linezolid in treatment of hospital acquired methicillin-resistant Staphylococcus aureus (MRSA) pneumonia

2014-02-04

In this study, the authors selected 58 patients with hospital acquired MRSA pneumonia treated by linezolid were selected, and the clinical efficacy and safety were observed. The healing rate of linezolid therapy was 36.2%, the efficacy was 67.2%, the bacteria clearance rate was 65.5%, the survival rate was 84.5% and the mortality was 15.5%. The mortality in the diagnosed dose group was 32.0%, and that in the empirical dose group was 3.0%, and the mortality in the empirical dose group was significantly lower compared with the diagnosed dose group. The incidence of adverse responses was 3.5%, which was mild and not affected the therapy. Linezolid has certain efficacy in treatment of hospital acquired MRSA pneumonia with mild reverse responses, which can be considered as one of primary drugs for the treatment of hospital acquired MRSA pneumonia.

Authors: Zheng, Chong-wei; Ye, Heng; Chen, Chun-bo; Xie, Di; Zhang, Yi-chen; Zhan, Wei-feng; Chen, Miao; Sun, Cheng; Zeng, Hong-ke; Zeng, Wen-xin

Full Source: Guangdong Yixue 2012, 33(20), 3155-3157 (Ch)

OCCUPATIONAL

Genotoxicity of vinyl chloride and application of its benchmark dose (BMD) in occupational exposure limit

2013-12-17

During the present study, the authors investigated the dose-effect relationship and impact factor between cumulative exposure dose (CED) of vinyl chloride monomer (VCM) and chromosomal damage, thereby its benchmark dose (BMD) was estimated. Cytokinesis-block micronucleus (CBMN) assay was used in 229 VCM-exposed workers and 138 controls for the detection of chromosome damage in peripheral blood lymphocytes. The cumulative exposure dose (CED) of VCM was calculated based on the job type and duration of each worker and VCM concentration in workplaces. Dose-response relationship between CED of VCM and CBMN frequency was evaluated for the calculation of BMD. The results showed that the CBMN frequency in exposure group was (3.73(0.16)‰, significantly higher than that of control group [(1.23(0.11)‰, P<0.01],
the 95% lower confidence bound of BMD of CED was 2.86 mg/m³ per year for both genders; if assume the work life was 40 years, the estimated exposure limit should be 0.072 mg/m³ per year. VCM exposure may induce chromosomal damage even at the occupational exposure levels below the occupational health standards of China. Therefore, the authors conclude that better dose-response assessment and BMD estimations are demanded in order to improve the quantification of occupational exposure limits of VCM and to protect against cancer risk.

Authors: Hao, Yan-hui; Wang, Wei; Qiu, Yu-lan; Liu, Jing; Zhu, Yi-liang; Xia, Zhao-lin

Full Source: Zhongguo Gongye Yixue Zazhi 2012, 25(6), 414-418 (Ch)

Present status investigation on occupational hazards of certain shoemaking enterprise in Wuhan city
2013-12-17
In this study, the authors analysed the occupational hazards in a shoemaking enterprise. The production process was investigated and occupational health in certain shoemaking enterprise in Wuhan city were examined. the results showed that the biggest risk in the shoemaking enterprise was benzene. High temperatures had fewer occupational hazards, but they had synergistic effects with chemical poisons.

Authors: Wang, Ying; Liu, An-sheng

Full Source: Zhongguo Gongye Yixue Zazhi 2012, 25(6), 443-444 (Ch)

Dust and iron removing device for powdery material with deduster and electromagnetic iron remover arranged in one passage
2013-12-17
In this study, the authors described a device for removing dust and iron. The title dust and iron removing device for powdery material comprises a pulveriser, a deduster, a conical buffer device, an electromagnetic iron remover, and a semi-finished product trough, wherein the deduster is composed of a filter cartridge and a deduster box, a blower fan is arranged on the outer side of the deduster box, the filter cartridge is fixedly mounted in the deduster box, a bracket is arranged below the deduster, the conical buffer device is arranged in the bracket, a discharging valve is arranged below the conical buffer device, the electromagnetic iron
This study discusses an process and apparatus for recycling volatile organic compounds in coating and printing industry. The process comprises using coater volatiles collection cover for collection of volatile organic compounds mixed gas produced in coater coating and drying process, compressing into the condensing system for complete condensation, adding the resulting condensate into the gas-liquid separator to obtain a high concentration of coating solvent, adding non-condensing lean gas into the membrane separation and enrichment system, enriching to obtain high concentrations of organic matter mixed gas, and then returning to the condensate system front loop again. The separation membrane for coating and printing industry VOC has high permselectivity, and can quickly enrich volatile organic compounds. The title apparatus has VOC recovery rate of 90%, organic matter content in tail gas of not >1 g/m³ after treatment, the integrated new technology greatly reduces the coating printing industry production costs and protect the atmospheric environment.

Authors: Jin, Wanqin; Cao, Mingming; Wei, Wang; Ding, Xiaobin; Xing, Weihong

Full Source: Faming Zhuanli Shenqing CN 103,277,982 (Cl. F25J3/08), 4 Sep 2013, Appl. 10,192,782, 21 May 2013; 10pp. (Ch).
Single-cylinder back pressure turbine-based coal-fired power plant CO₂ removal integrated system

2013-12-17

This study describes the single-cylinder back pressure turbine-based coal-fired power plant CO₂ removal integrated system. The invention, belonging to the field of energy saving technology, wherein the system mainly consists of a turbine power generation unit and a CO₂ capture unit. The turbine low pressure cylinder of the turbine power generation unit consists of a back pressure low-pressure cylinder and a condensing low-pressure cylinder, and the exhaust pipe of the backpressure low-pressure cylinder is divided into a main exhaust pipe and a bypass duct. Under decarburisation condition, bypass pipe is closed, and back-pressure cylinder exhaust steam pipe is respectively connected to heat exchanger and reboiler; while under non-decarburisation condition, the main exhaust pipe is closed, back-pressure cylinder exhaust steam pipe is connected with the small turbine. The CO₂ capture unit is mainly composed by an absorption tower and a desorption tower, wherein the top end of the desorption tower is linked to the CO₂ multi-stage compression unit through a top cooler and a separator, and a part of condensate heated by the top cooler and the CO₂ multi-stage compression unit enters the steam generating unit after mixing. The authors concluded that the present invention can improve the utilisation of steam, adjust the operation of carbon reduction system according to different working conditions, and obtain higher plant efficiency.

Authors: Xu, Gang; Tang, Baoqiang; Wu, Ying; Liu, Wenyi; Yang, Yongping; Ding, Jie

Full Source: Faming Zhuanli Shenqing CN 103,277,154 (Cl. F01K17/00), 4 Sep 2013, Appl. 10,215,113, 31 May 2013; 9pp. (Ch)

PUBLIC HEALTH

Biomarkers of human exposure to personal care products: Results from the Flemish Environment and Health Study (FLEHS 2007-2011)

2013-12-17

Personal care products (PCPs), such as soaps, perfumes, cosmetics and lotions, contain a variety of chemicals that have been described as potentially hormone disrupting chemicals. Therefore, it is important to
To evaluate the cytokine balance and enzymic alterations induced by environmental pesticide exposure during pregnancy, this transversal study explored placentas derived from non-exposed women (control group-CG), and from women living in a rural area (rural group-RG), collected during intensive organophosphate (OP) pesticide spraying season (RG-SS) and during non-spraying season (RG-NSS).

Authors: Den Hond, Elly; Paulussen, Melissa; Geens, Tinne; Bruckers, Liesbeth; Baeyens, Willy; David, Frank; Dumont, Emmie; Loots, Ilse; Morrens, Bert; Nemery de Bellevaux, Benoit; Nelen, Vera; Schoeters, Greet; Van Larebeke, Nicolas; Covaci, Adrian

Full Source: Science of the Total Environment [online computer file] 2013, 463-464, 102-110 (Eng)
In this study, the authors investigated the associations between personal temperature exposure and cardiac autonomic function as reflected by heart rate variability (HRV) in a panel of 14 healthy taxi drivers in the context of traffic-related air pollution.

Authors: Bulgaroni, Vanina; Lombardo, Paola; Rivero-Osimani, Valeria; Vera, Berta; Dulgerian, Laura; Cerban, Fabio; Rivero, Virginia; Magnarelli, Gladis; Guinazu, Natalia

Full Source: Reproductive Toxicology [online computer file] 2013, 39, 23-32 (Eng)

Temperature, traffic-related air pollution, and heart rate variability in a panel of healthy adults

2013-12-17

Both ambient temperature and air pollution have been associated with alterations in cardiac autonomic function, but the responsive patterns associated with temperature exposure and the interactive effects of temperature and air pollution remain largely unclear. In this study, the authors investigated the associations between personal temperature exposure and cardiac autonomic function as reflected by heart rate variability (HRV) in a panel of 14 healthy taxi drivers in the context of traffic-related air pollution. Real-time data was collected on study subjects' in-car exposures to temperature and traffic-related air pollutants including particulate matter with an aerodynamic diameter <2.5 μm (PM2.5) and carbon monoxide (CO) and HRV indexes during work time (8:30-21:00) on 48 sampling days in the warm season (May-September) and cold season (October-March). The authors applied mixed-effects models and loess models adjusting for potential confounders to examine the associations between temperature and HRV indexes. The results showed nonlinear relationships between temperature and HRV indexes in both the warm and cold seasons. Linear regression stratified by temperature levels showed that increasing temperature levels were associated with declines in standard deviation of normal-to-normal intervals over different temperature strata and increases in low-frequency power and low-frequency:high-frequency ratio in higher temperature range (>25 °C). PM2.5 and CO modified these associations to various extents. The authors...
As the trace element strontium (Sr) plays a significant role in dental health, it is important to determine the Sr concentration and isotope composition (87Sr/86Sr) of teeth and whether these values are related to caries formation, age and sex. A total of 160 permanent teeth were collected from 7- to 79-yr old people from the southern Shaanxi area of China, including 100 healthy teeth and 60 carious teeth (men and women each accounted for half of the samples). The concentration and isotope composition of Sr elements in the dental enamel of the teeth were measured using inductively coupled plasma mass spectrometry (ICP-MS) and thermal ionisation mass spectrometry (TIMS). A significantly lower Sr concentration was found in the enamel of the carious teeth than in that of the healthy teeth for individuals of varying ages and sex. The Sr concentration in human carious teeth ranged between 79.70 ìg/g and 85.80 ìg/g; while the Sr concentration in healthy teeth ranged between 128 ìg/g and 156.77 ìg/g. The findings demonstrated that the 87Sr/86Sr ratio did not appear to be affected by the caries formation, age or sex. The 87Sr/86Sr ratio in the enamel of the healthy and carious teeth of individuals of varying ages and genders ranged between 0.710935 and 0.711037, which falls into the range of 87Sr/86Sr ratios found in the local, naturally occurring water, soils and rocks. The authors concluded that Sr plays a significant role in dental health, and there is a negative correlation between Sr and the occurrence of dental caries. The 87Sr/86Sr ratio of teeth reflects the 87Sr/86Sr ratio of the associated environment, and there
Technical

is no significant relationship with the frequency of dental caries, age or sex.

Authors: Li, Zixia; He, Maoyong; Peng, Bin; Jin, Zhangdong

Full Source: Rapid Communications in Mass Spectrometry 2013, 27(17), 1919-1924 (Eng)

Open-Label Randomised Clinical Trial of Atropine Bolus Injection Versus Incremental Boluses Plus Infusion for Organophosphate Poisoning in Bangladesh

2013-12-17

Severe organophosphate compound (OPC) poisoning is an important clinical problem in many countries of the world. Unfortunately, little clinical research has been performed and little evidence exists with which to determine the best therapy. In this study, the authors determined the optimal dosing regimen for atropine in the treatment of OPC poisoning. An open-label randomised clinical trial was conducted in Chittagong Medical College Hospital, Chittagong, Bangladesh, on 156 hospitalised individuals with OPC poisoning from June to September 2006. The aim was to compare the efficacy and safety of conventional bolus doses with individualised incremental doses of atropine for atropinization followed by continuous atropine infusion for management of OPC poisoning. Inclusion criteria were patients with a clear history of OPC poisoning with clear clinical signs of toxicity, i.e. features of cholinergic crisis. The patients were observed for at least 96 h. Immediate outcome and complications were recorded. Out of 156 patients, 81 patients received conventional bolus dose atropine (group A) and 75 patients received rapidly incremental doses of atropine followed by infusion (group B). The mortality in group A’ was 22.5% (18/80) and in group B’ 8% (6/75) (p < 0.05). The mean duration of atropinization in group A’ was 151.74 min compared to 23.90 min for group B’ (p <0.001). More patients in group A experienced atropine toxicity than in group B’ (28.4% vs. 12.0%, p < 0.05); intermediate syndrome was more common in group A’ than in group B’ (13.6% vs. 4%, p < 0.05), and respiratory support was required more often for patients in group A’ than in group B’ (24.7% vs. 8%, p < 0.05). Rapid incremental dose atropinization followed by atropine infusion reduces mortality and morbidity from OPC poisoning and shortens the length of hospital stay and recovery. Incremental atropine and infusion should become the treatment of choice for OPC poisoning. The authors concluded that given the paucity of existing evidence, further clinical studies should be performed to
This study described the developed of a new toner collection system. An air current separator (ACS) was designed to separate organic material for incineration and inorganic material for disposal. Toner particle movement behaviour in the ACS was analysed, and an optimised air current speed operating parameter was obtained by theory analysis and experiments. To control noise, noise levels emitted by different line processes were measured. Results indicated noise levels emitted by the crusher and agitator/magnetic separator were greater than permissible noise exposure levels of the Occupational Safety and Health Standards. Noise levels of other line processes were relatively low. An acoustic hood was developed to reduce crusher and AMS noise levels.

Authors: Ruan, Jujun; Jia, Li; Xu, Zhenming.

Full Source: Environmental Science & Technology [online computer file] 2013, 47(12), 6457-6462 (Eng)

Redefining Risk Boundaries in a Shifting Global Chemical Market

2014-02-04

Over the last 10-15 years, the global chemical industry experienced remarkable growth, an increase largely driven by the eastward migration of the global economy towards Asia. The rise in market share within Asia poses long-term strategic challenges for European Union (EU)- and North American Free Trade Agreement (NAFTA)-based companies. Key public health-related questions resulting from this shift are: whether Western assumptions concerning human health and environmental risks from chemical production/use reflect realities; and if not, whether...
these transferred/exacerbated risks within emerging/developing countries should, based on ethical reasons, be considered when evaluating risks within industrialised countries. Given these ethical concerns, the boundaries used to evaluate risks within industrialised countries should be redefined to account for inconsistent regulatory standards and compliance that, by Western standards, likely contribute to unacceptable human health and environmental risks within intensive chemical producing regions of emerging/developing countries. A more viable, long-term alternative would be to survey the global chemical industry landscape; identify high priority sub-sectors (e.g., basic off-patent chemicals), countries, and regions requiring risk mitigation; and encourage rebalancing production for these chemical sub-sectors within industrialised countries. Since operating costs would be higher in industrialised countries, offering production subsidies (e.g., tax credits) for multinational chemical companies is critical to attract relocation and provide chemicals to consumers along the global supply chain at or below current market prices. In addition to addressing potential ethical concerns about risks to emerging/developing countries, the latter proposal would help revitalise chemical production, jobs, and investment within EU and NAFTA countries.

Authors: Volz, David C.; Elliott, Kevin C.

Full Source: Environmental Science & Technology [online computer file] 2013, 47(12), 6069-6070 (Eng)

**Automobile exhaust energy recovery unit**

2014-02-04

This study discusses the automobile exhaust energy recovery unit. The unit includes a thermoelectric power generating device, and electrolytic hydrogen production device comprising an electrolytic cell, a hydrogen separator, a supercharger and a hydrogen storage device. The electrolytic cell is powered by the thermoelectric power generating device. The hydrogen separator connects with the electrolytic cell and the supercharger, and the outlet of the supercharger connects with the inlet of the hydrogen storage device. The hydrogen storage device connects to an air duct of an engine through a hydrogen charging control valve and an anti-backfire device, and the hydrogen charging control valve connects with a controller simultaneously connected with the hydrogen charging control valve and a throttle opening sensor arranged at a throttle motor door. The hydrogen storage device is also provided with a pressure-limiting safety valve. The automobile exhaust energy recovery effect is
good, and the invention can improve the performance of the engine almost without any modification to the engine, increase engine power and emission performance, and decrease automobile oil consumption.

Authors: Xu, Ming; Liu, Xiangyang; Luo, Xianren.

Full Source: Faming Zhuanli Shenqing CN 103,114,898 (Cl. F01N5/02), 22 May 2013, Appl. 10,361,712, 26 Sep 2012; 8pp. (Ch).