NATURE PHENOMENA AND INNOVATIVE ENGINEERING

Numerical simulation of deposited behaviours of Al particle on Mg substrate in supersonic particles deposition

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ANSYS/LS-DYNA is used to simulate supersonic particles deposition process of Al particle impinging on Mg substrate. Critical velocities of particle at different spraying temperatures and deformation, highest temperatures, stress and strain of particle/substrate are studied. The results show that with the increasing of spraying temperatures, the critical velocities experience a small amplitude decrease. For the two aspects of single particle and two-particle impingements, the highest temperature rises with the increasing of initial temperature and the deformation morphology and stress and strain of particle/substrate vary with/without tamping effect. Upon the effect of tamping, the flatten ratio of pre-deposit particle is bigger than the particle without the tamping effect at the same velocity. The values of maximum stress and strain of two-particle with tamping effect are both higher than single particle impinging. The change gradient of stress without tamping effect is much steeper in comparison of two-particle impinging with the velocity increasing while the change curve tendency of maximum strain is similar to the flatten ratio.

Keywords: supersonic particles deposition, simulation, tamping effect, critical velocities, stress and strain

Study on supported perovskite-type catalysts for catalytic combustion of volatile organic compounds

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LaxCe1-xMyN1-γO3 was supported on γ-Al2O3 by equal volume impregnation method. The effects of loading amount, calcination temperature, element type and element ratio in the A-site and B-site on catalytic combustion of toluene were investigated. Then the catalysts were characterized by XRD, BET and SEM. The results showed that the optimum preparation condition of the catalyst was the loading amount of 12%, the calcination temperature of 750°C, and the catalyst form was La0.8Ce0.2Mn0.8Co0.2O3/γ-Al2O3. Under the action of this catalyst, the ignition temperature T50 and complete conversion temperature T90 of toluene were 243°C and 303°C, respectively. The supported perovskite catalyst maintained perfect perovskite structure and dispersed uniformly. Its surface area and porosity were greatly increased. The whole structure was fluffy and conductive to practical application.

Keywords: volatile organic compounds, catalytic combustion, perovskite, support

Nursing on maternity anesthesia surgery

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Objective: Analysis to strengthen the effect of nursing in gynecology and obstetrics anesthesia surgery. Method: This study had select the 100 cases of patients with the treatment of anesthesia surgery of obstetrics and gynecology in our hospital from July 2012 to July 2014, in which, there were 60 cases of patients for full term care on perianesthsia care period, and 40 cases of patients (the control group) whom were only given general nursing. This paper compared the nursing effect of the two group. Results: recover fineness rates of anesthesia care group was 96.7%, patients satisfaction rate was 96.7%, the incidence rate of complications was 7%; recover fineness rates of control anesthesia was 87.5%, the patient satisfaction rate 85.0%, and the complication rate was 7.5%; The anesthesia care group effect was more promising ($P<0.05$). Conclusion: the full term perianesthsia care could significantly improve the anesthesia effect during the maternity anesthesia, and worth clinical extensive application.

Keywords: Gynecology and obstetrics surgery, anesthesia, nursing

Perioperative nursing on patients undergoing gynecologic laparoscopic surgery

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Investigate on perioperative nursing on patients undergoing gynecologic laparoscopic surgery. Methods: There were 121 cases of obstetrics and gynecology patients who were selected in our hospital, they were required to laparoscopic surgery and were randomly divided into control group, 61 cases in this group, they were given routine care, there were 60 cases in observation group, they were given Psychological Nursing care on the bases of routine care which the same as control group. Compare the sedative effect, psychological reactions, clinical signs and SAS score to evaluate the effect of psychological care. Results: compared to the control group, the anxiety cases of observation group was of significantly less ($P<0.05$); compared with admission, SAS scores in observation group on the preoperative and 1 day after decreased significantly($P<0.05$). Compared with the control group, the observation group at each time point was significantly lower in the depth of sedation score ($P<0.05$); the differences in the systolic blood pressure and heart rate after break five minutes between two groups were significant ($P<0.05$). Conclusion: compared with obstetrics and gynecology laparoscopic surgery patients in the periaesthesia give regular care to give psychological care to patients with depression, education sentiment mitigation, sedation enhancement surgery.

Keywords: Laparoscopy, Obstetrics and gynecology, Perianesthesia, Psychological care

Using laser scanning technology to 3D Imaging and study on volume measurement

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Based on the necessary of large volume fast measurement of material stack, this article introduced the principle of laser scanning technology in achieving 3D imaging and volume measurement, and the method of establishing 3D surface model with coordinate conversion and image processing effectively, in order to improve the accuracy of volume measurement in material stack. Experimental result shows good characteristic of speediness, accuracy and short periodic.

Keywords: coordinate conversion, image processing, surface model, volume measurement

