

and EA modulator are integrated. To improve the rate of laser modulation, the modulation model is built, the coupling parameters are optimized, the electrode structure is improved, and the chirp effect is reduced. The laser modulation method is OOK, which uses the signal mixed method to fuse the multi-channel video data from the surgery. The fused data is loaded into the modulator through the driving circuit. The receiver receives and fuses the signal, then constructs the video scene of the operation site.

**Results** The transmission rate achieved was 2.5Gbps, BER precedes  $1E-7$ , the transmission delay was less than 1 ms and the four-channel HD video signal was fused.

**Conclusions** The technology is very suitable for biomedical imaging because the wireless laser communication does not have electromagnetic radiation, promotes good real-time results and does not require laying of a cable.

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#### TISSUE VAPORIZATION MECHANISM IN PHOTOSELECTIVE VAPORIZATION OF THE PROSTATE BASED ON EDFA

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**Background** To develop a more efficient scheme in photoselective vaporization of the prostate (PVP) with fewer side effects, as well as to determine the critical time of tissue coagulation or vaporization and the degree of thermal damage of the tissue, the tissue vaporization mechanism in photoselective vaporization of the prostate based on EDFA was analyzed.

**Methods** By comparing the laser vaporization effect of animal liver tissue, muscle tissue and prostate tissue, a laser operation scheme based on EDFA was proposed. The 1064 nm laser is used as the light source, whose power is amplified by EDFA, and the 532 nm laser is obtained by frequency doubling of KTP, which has higher vaporization efficiency and less thermal damage in PVP operation.

**Results** When the output power of the system is 48.9 W, the frequency is 50 Hz, the pulse width is 5 ms, and the action time is 10 s. In dog prostate samples, the vaporization pit with diameters of 2.0 mm and 3.5 mm, respectively, are produced in aqueous and air conditions, and the thermal damage thickness is 0.4 mm and 0.8 mm.

**Conclusion** The experimental results show that the establishment of the system is of great significance for the study of the tissue vaporization mechanism and provides a valuable reference for further improvement of PVP operation.

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#### NEW TWINNING MECHANISM IN HEXAGONAL-CLOSE-PACKED STRUCTURED BIOMATERIALS

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**Background** Magnesium and titanium alloys are important biomaterials due to their good biocompatibility. However, the twinning mechanism in them remains obscure.

**Methods** The lattice structure of  $\{10\bar{1}2\}$  twin boundaries in a deformed magnesium alloy was examined by using high-resolution transmission electron microscopy and compared with a previously established model.

**Results** A type of atomic cluster with a specified structure was discovered to appear at the distorted lattice area of the twin boundary. The orientation of the atomic clusters shows a clear rotation tendency from the parent to the twin.

**Conclusion** The twinning in hexagonal-close-packed metals was confirmed to be induced by the reorientation of the atomic clusters.

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#### DESONIDE COMBINED WITH TIMOLOL FOR THE TREATMENT OF SUPERFICIAL INFANTILE HEMANGIOMAS

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**Background** To discuss the safety and efficacy of desonide combined with timolol for the treatment of superficial infantile hemangiomas.

**Methods** From June 2017 to December 2017, 56 infants with superficial hemangiomas were treated by topical application of desonide cream and timolol maleate eyedrops. Patients' clinical data including gender, age, hemangioma position and their changes before and after treatment were retrospectively analyzed. The therapeutic effects were evaluated by two dermatologists at 2 weeks and 3 months after desonide and timolol treatment. The therapeutic effects were rated as: ineffective, the lesion continued growing; partly effective, lesion remission rate  $\geq 50\%$  but no complete remission in size, color and texture; effective, the lesion was in complete remission.

**Results** A total of 56 patients received desonide and timolol treatment, and 20 patients were observed as controls. Two weeks after treatment the hemangioma became softer and smaller. At 3 months, the overall response was ineffective in 3 patients (5.36%), partly effective in 15 (26.79%), and effective in 38 (67.86%), of which 5 patients' hemangiomas had completely disappeared but had a small amount of angiotelectasis. In the control group, the overall response was ineffective in 16 patients (80%), partly effective in 3 (15%), and effective in 1 (5%). The effectiveness and regression rate of the desonide and timolol treated group (94.64%, 67.86%) were significantly better than the control group (20%, 5%) ( $p < 0.05$ ), and no side effects were observed.

**Conclusion** It is safe and effective to use desonide and timolol to treat superficial infantile hemangiomas.