

J. Li *et al.*, "A Micro-Machined Optical Fiber Cantilever as a Miniaturized pH Sensor," in *IEEE Sensors Journal*, vol. 15, no. 12, pp. 7221-7228, Dec. 2015.
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Abstract: A micro-cantilever fabricated using a combination of picosecond-laser machining and focused ion beam milling directly onto the end of a standard telecommunications optical fiber is demonstrated as a liquid pH sensor. Conventional pH meters typically require relatively large reaction volumes up to ~50 mL, which is not always convenient. The micro-scale nature of this sensor offers the potential for pH measurement on a smaller sample volume down to micro-liter. The fiber end-tip cantilever is coated with a pH sensitive layer, and the pH-induced deflection is monitored interferometrically. A detectable pH range from 4.0 to 10.0 is demonstrated for the cantilevers coated with 16-mercapto-hexadecanoic-1-acid as the functional layer, and a detectable pH range from 4.0 to 9.0 is demonstrated for the cantilevers coated with Al₂O₃ as the functional layer.

keywords: {antireflection coatings;cantilevers;chemical sensors;fibre optic sensors;focused ion beam technology;laser beam machining;microfabrication;milling;optical fibre communication;optical fibre fabrication;optical films;organic compounds;pH measurement;16-mercapto-hexadecanoic-1-acid;fiber end-tip cantilever coating;focused ion beam milling;microcantilever fabrication;micromachined optical fiber cantilever;miniaturized liquid pH sensor;pH measurement;pH meter;pH sensitive layer;pH-induced deflection;picosecond-laser machining;standard optical fiber telecommunication;Cavity resonators;Optical fiber sensors;Optical fibers;Temperature measurement;Temperature sensors;Focused ion beam;focused ion beam;optical fiber cantilever;pH sensing;ps-laser machining},
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Zhao Jing and Xiao Shao-rong, "A digitalized design of high-precision visibility meter transmitter," *Proceedings 2013 International Conference on Mechatronic Sciences, Electric Engineering and Computer (MEC)*, Shenyang, 2013, pp. 506-510.
doi: 10.1109/MEC.2013.6885119

Abstract: To achieve the steady output of the visibility meter probe beam, a high-precision and digitalized visibility meter transmitter based on FPGA has been designed. A bunch of scattered light has been used for the feedback signal of optical power control circuit. In FPGA, the signal entered filtering, RMS conversion, amplification and differential module to achieve current dynamic adjustment. In the temperature control unit, the increment digital PID control arithmetic has been adopted and PWM has been used for the output form. The experimental result shows that the system is stable and the fluctuation of transmitter output light intensity is 1.4%.

keywords: {amplification;atmospheric optics;field programmable gate arrays;geophysical signal processing;three-term control;FPGA;RMS conversion;amplification;differential module;digital PID control arithmetic;digitalized design;feedback signal;high precision visibility meter transmitter;optical power control circuit;scattered light;visibility meter probe beam;Field programmable gate arrays;Optical filters;Optical receivers;Optical sensors;Optical transmitters;Temperature control;Temperature sensors;FPGA;PID;PWM},
URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6885119&isnumber=6885035>

H. Yang, S. Gao, Z. Sun, Y. Jiang, G. Zhai and M. Li, "Temperature Control Based on PID for Colloidal Crystals Investigation," *2010 Second WRI Global Congress on Intelligent Systems*, Wuhan, 2010, pp. 51-54.
doi: 10.1109/GCIS.2010.232

Abstract: Kossel-line diffraction method is an important way to measure the structure of crystals. Colloidal crystal is one of the hotspots on the condensed physics research. In order to obtain the diffraction image, a 473nm wavelength laser is used to irradiate samples, and then the Kossel-line image of sample is projected onto the translucent screen and recorded by charge coupled device (CCD) camera. The influence of temperature changing is one of the important crystallization research contents. A proportional-integral-derivative (PID) algorithm based on pulse-width modulation (PWM) is proposed to control the temperature of the sample solution.

keywords: {CCD image sensors;X-ray diffraction;colloidal crystals;crystallisation;image processing;pulse width modulation;temperature control;three-term control;Kossel line diffraction method;PID;charge coupled device camera;colloidal crystal;condensed physics;diffraction image;image sample;pulse width modulation;temperature control;translucent screen;Colloidal crystals;Correlation;Crystallization;Diffraction;Optical diffraction;Temperature control;X-ray diffraction;PID;PWM;colloidal crystal;system identification;temperature control},
URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=5708676&isnumber=5708664>

S. W. Bishnoi, C. S. Levin, C. J. Rozell, B. R. Johnson, D. H. Johnson and N. J. Halas, "All-optical nanoscale pH meter: a plasmonic nanodevice with quantifiable output," *LEOS 2006 - 19th Annual Meeting of the IEEE Lasers and Electro-Optics Society*, Montreal, Que., 2006, pp. 300-301.
doi: 10.1109/LEOS.2006.279067

Abstract: In this paper, we report an all-optical SERS-based nanodevice capable of measuring pH in its local nanoscale vicinity continuously over the range 5.8 to 7.6 pH units. The device consists of an Au nanoshell with a pH sensitive molecular adsorbate functions as a standalone, all-optical nanoscale pH meter that monitors its local environment with an average accuracy of plusmn0.1 pH units across its operating range

keywords: {chemical sensors;gold;nanoparticles;optical sensors;pH measurement;spectrochemical analysis;surface enhanced Raman scattering;Au;all-optical SERS-based nanoscale pH meter;nanoshell;pH measurement;pH sensitive molecular adsorbate;plasmonic nanodevice;Biomedical measurements;Chemical technology;Gold;Nanobioscience;Nanoscale devices;Nanostructures;Optical scattering;Optical sensors;Plasmons;Raman scattering},
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F. Ficorella, G. F. Dalla Betta, L. Viarani, M. Perenzoni, D. Stoppa and L. Gonzo, "3DJAM: A Linear CMOS Sensor for 3D Vision with Merged I-TOF and OT Techniques," *2006 Ph.D. Research in Microelectronics and Electronics*, Otranto, 2006, pp. 261-264.
doi: 10.1109/RME.2006.1689946

Abstract: 3DJAM is a novel 3D image sensor, implemented with a 3.3V, 0.35µm CMOS technology, that combines the optical triangulation (OT) and the indirect time of flight (I-TOF) techniques in a single chip for range finding scanners. It has been designed to cover very large depth scenes (up to 20 meters), achieving sub-millimeter resolution over the OT range (below 2 meters), working with a single pulsed laser source and also taking advantage of ambient light removal. The chip embeds also a programmable logic unit, which supervises over all the internal functions (like timing, pipelining, data transfer), a power supply unit (for both the analogue and the digital subsystems) and an analogue output buffer that can drive an external ADC for data acquisition

keywords: {CMOS image sensors;programmable logic devices;0.35 micron;3.3 V;3D vision;3DJAM;ambient light removal;analogue output buffer;indirect time of flight;linear CMOS sensor;optical triangulation;programmable logic unit;pulsed laser source;range finding scanners;CMOS image sensors;CMOS technology;Image sensors;Layout;Optical buffering;Optical design;Optical pulses;Optical sensors;Programmable logic arrays;Pulsed power supplies},
URL: <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=1689946&isnumber=35631>