

nano 1 (Forskerprosjekt)

Applicant

Institution/company responsible for the project

Institution / company (norwegian name)* Universitetet i Bergen
Faculty Faculty of Mathematics and Natural Sciences
Institute Department of Physics and Technology
Departement
Address* Allégaten 55
City code* N-5007
City* Bergen
Country* Norway
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Enterprise number
Auditor

Administrative responsibility

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Project manager

First name* Rolf K.
Last name* Eckhoff
Institution / company (norwegian name) Universitetet i Bergen
Faculty Faculty of Mathematics and Natural Sciences
Institute Department of Physics and Technology
Departement Process Technology Section
Address* Allégaten 55
City code* N-5007
City* Bergen
Country* Norway
Position/title Professor
Academic degree Dr. techn.
Preferred language Bokmål
Phone* (+47) 5558 2858
E-mail* Rolf.Eckhoff@ift.uib.no

Project info

Project title

Project title* DYNAMICS, DISPERSION, IGNITION AND COMBUSTION OF NANO-PARTICLE CLOUDS

Principal objective and sub-goals

Experimental determination of ignition sensitivity (minimum electric spark ignition energy) as function of particle size. (UiB)

Project publication plan

3 Ph.D thesis thesis

10 Master thesis

10 papers in review journals

Budget

Cost plan (in NOK 1000)

	2004	2005	2006	2007	2008	Sum
Personnel costs and indirect costs	2700	5400	5400	2700		16200
Purchase of R&D services	800	1000	800	600		3200
Equipment	3900	200	200	100		4400
Other operating costs	200	400	400	200		1200
Totals	7600	7000	6800	3600	0	25000

Specifications Purchase of R&D services are from GexCon, with 50% own support.

Equipments for UiB:
PCS/LS combination (Beckman Coulter) 1800
Phantom High Speed Camera 400
Dantec Laser Doppler, LDA, 900
Julius Peter bomb calorimeter 300
Oscilloscope 100
PCs, Equipment for nano particle manufacture .. 40

Cost code (in %)

	2004	2005	2006	2007	2008	
Business and industry	11	14	12	17		
R&D Institute sector						
University sector	89	86	88	83		
Other sectors						
Totals	100	100	100	100	0	

Funding plan (in NOK 1000)

	2004	2005	2006	2007	2008	Sum
Own funding	1550	3100	3100	1550		9300
EU funding	400	400				800
Other public-sector funding						0
Other private funding	400	400				800
From Research Council	5250	3100	3700	2050		14100
Totals	7600	7000	6800	3600	0	25000

Allocations from the Research Council (in 1000 NOK)

	2004	2005	2006	2007	2008	Sum
Student fellowships						0
Doctoral fellowships	825	1650	1650	825		4950
Post-doctoral fellowships	325	650	650	325		1950
Fellowships for visiting researchers						0
Overseas fellowships						0
Researcher positions						0
Hourly-based salary including indirect costs						0
Sum personnel costs and indirect costs	1150	2300	2300	1150	0	6900
Purchase of R&D services		200	800	600		1600
Equipment	3900	200	200	100		4400
Other operating expenses	200	400	400	200		1200
From Research Council	5250	3100	3700	2050	0	14100

Person for whom a fellowship/position is being sought

First name Last name Personal number Type of position/fellowship Position-%

Documentation for calculation of overseas fellowships and guest researcher fellowship (Specify the period)

Foreign institution

Name
Address
City code
City
Country

Travelling with family

Travelling expenses

Period

From date (yyyymmdd)

Active partners

Description of active partners

University of Bergen, Department of Physics and Technology, Process technology group
Professor Rolf K. Eckhoff, Professor Alex C. Hoffmann, Associate Professor Bjørn J. Arntzen

The research and consulting company GexCon (45% owned by UiB), including the EU research project DESC, development of a Dust Explosion Simulation Code

Norwegian University of Science and Technology, Department of Physics
Professor Alex Hansen

University of Oslo, Department of Physics
Professor Eirik Grude Flekkøy

The process-safety group of Rolf Eckhoff and Bjørn Arntzen has research front specialities in accidental gas, mist/spray, and dust explosions, and the group's research in these areas is recognized internationally. Current research comprises both experimental and theoretical/modelling work. Both Eckhoff and Arntzen worked at GexCon (formerly CMI/CMR) before moving to UoB, and close contact and cooperation with GexCon is maintained. Cooperation with GexCon is also included in the present work proposal, in particular on developing a comprehensive commercial numerical code for predicting flame propagation processes in nano particle clouds. The group includes 5 dr. students and 4 master students. One dr. students work with minimum ignition energy of dust and Three dr. students work with dust explosion experiments and modeling of gas and dust explosions in inside equipment, partly related to the EU research project DESC, Dust Explosion Simulator Code.

GexCon is a research and consultant company (45% owned by UiB) which has developed and is the owner of the worlds leading and most used CFD explosion simulator, FLACS□.

The muliti phase flow research group of Alex Hoffmanns is specialized in the field of transport phenomena in multiphase systems, both in research and teaching. We mention some running projects related to this proposal. We study particle-fluid phenomena using our own CFD software, both with Eulerian-Eulerian and Eulerian-Lagrangian simulations. Much of this research has been devoted to the problem of creation of particle clouds from a deposit behind shock waves. We are preparing a computer code for direct numerical simulation of particles in incompressible fluids. In another project we study the interaction between particles with adsorbates on them using Molecular Dynamics. In the context of this work we have made some initial simulations of agglomeration of nanoparticles. Another related activity is our work in fuel cell materials (MSOFC project). Here we are looking at applying nanoparticle technology to develop new fuel cell materials and components, and also using molecular dynamics to study the performance of fuel cell materials and components.

Both professor Eirik Grude Flekkøy and professor Alex Hansen belong to the Complex Group, a team from UiO, NTNU and IFE, working theoretically and experimentally on soft and complex matter, <http://www.phys.ntnu.no/CPX> It was in 2002 elected for a Strategic University Program the NFR.

Attachments

Project description (max 10 pages)*

Filename ES72014_001_20040218_ProjektnanoUiB.pdf

Curriculum vitae (CV) with list of publications*

Filename ES72014_002_20040216_NFR.nano.CV.pdf

Course marks (grades)

Filename

Experts

Filename ES72014_005_20040216_UiB.nano.experts.pdf

Recommendation and invitation (overseas fellowship)

Filename

Confirmation from active partner(s)

Filename ES72014_008_1_20040216_nano.UiB.support.pdf

Filename ES72014_008_2_20040216_nano.UiO.support.pdf

Filename ES72014_008_3_20040216_nano.gexcon.support.pdf

Supervisor's recommendation (student fellowship)

Filename

Other items

Filename