KIDA

KINETIC
DATABASE
FOR
ASTROCHEMISTRY

New logo !!!

What is KIDA?

•Database of chemical reactions and associated parameters for the interstellar medium and planetary atmospheres

•Uncritical compilation of data with detailed informations (uncertainties, temperature range, bibliographic reference, etc)

•Recommandations for key reactions by experts in the different fields of physico-chemistry

•Online interface (consulting and adding data to the database)

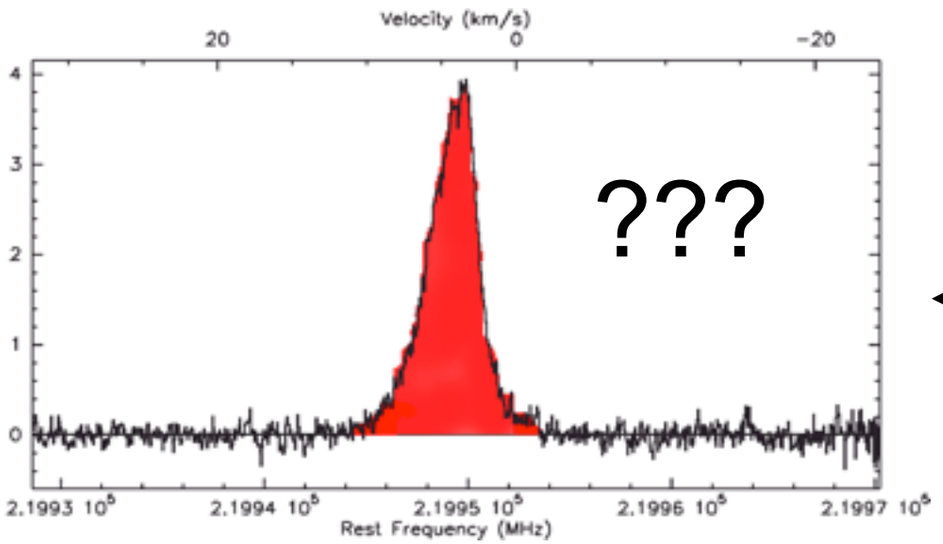
•Download list of reactions

•Group of experts advising for the data to be added to the database

•Store subsets of chemical reactions (models) for specific applications (Titan atmosphere, Hot Jupiters, ISM)

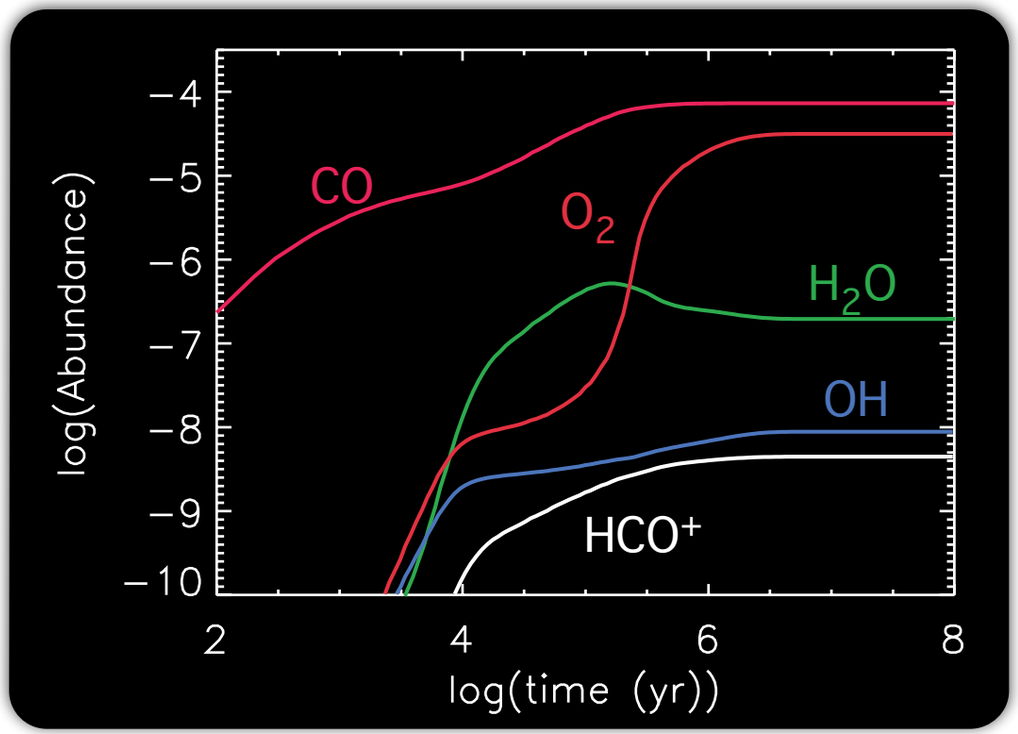
A quoi ça sert ?

KIDA
KINETIC DATABASE FOR ASTROCHEMISTRY



Pluridisciplinarité

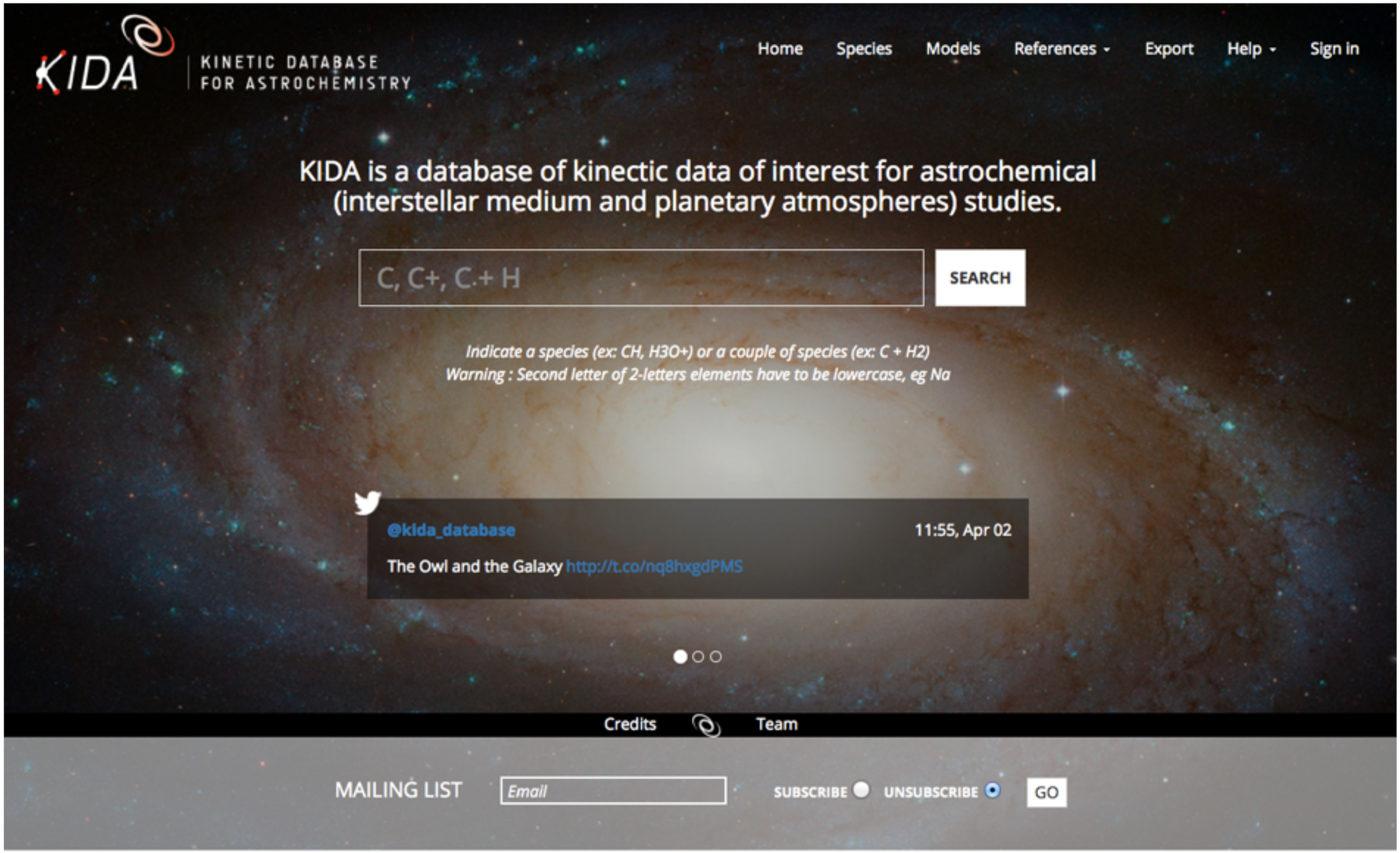
Milliers de taux de réactions



Modèle chimique

NEW KIDA online interface underdevelopment

http://integration-kida.obs.u-bordeaux1.fr/



Result of the search of the bimolecular reactions with CO.

KIDA | KINETIC DATABASE FOR ASTROCHEMISTRY

Home Species Models References Export Help Sign in

CO

Your search may contain lot of results.
Try some of these tips to filter results :

REACTANTS ○ | ● ION + NEUTRAL REACTION
PRODUCTS ○ | ○ NEUTRAL REACTION
BOTH ●

SEARCH

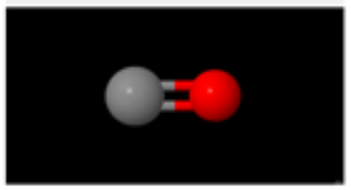
SPECIES 2 | UNIMOLECULAR REACTIONS 20 | BIMOLECULAR REACTIONS 502 | TERMOLECULAR REACTIONS 5 | SURFACE REACTIONS N/A

Details	*Formula*	*Name*	*Electronic state*
🔍	CO	Carbon monoxide	Ground State
🔍	(13)CO	Carbon monoxide	

You can filter results by unchecking isomers.

✔ CO

✔ (13)CO



CO

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Try some of these tips to filter results :

REACTANTS ○ | ◉ ION + NEUTRAL REACTION
PRODUCTS ○ | ○ NEUTRAL REACTION
BOTH ◉

SEARCH

SPECIES 2 | UNIMOLECULAR REACTIONS 19 | BIMOLECULAR REACTIONS 502 | TERMOLECULAR REACTIONS 5 | SURFACE REACTIONS N/A

502 result(s)

Reaction			*α*	*β*	*γ*	*T (K)*	*Formula*	*Evaluation*
$C^+ + O_2$	→	$O + CO^+$	3.42E-10	0.00E+0	0.00E+0	300-300	Kooij	✔
	→	$CO + O^+$	4.53E-10	0.00E+0	0.00E+0	300-300	Kooij	✔
$C^+ + SiO$	→	$CO + Si^+$	1.00E+0	1.61E-9	5.10E+0	10-800	ionpol1	?
$C^+ + SO$	→	$CO + S^+$	2.50E-1	1.40E-9	2.93E+0	10-643	ionpol1	?
	→	$S + CO^+$	2.50E-1	1.40E-9	2.93E+0	10-643	ionpol1	?
	→	$O + CS^+$	2.50E-1	1.40E-9	2.93E+0	10-643	ionpol1	?
	→	$CO + S^+$	2.50E-1	1.40E-9	2.93E+0	644-800	ionpol2	?
	→	$S + CO^+$	2.50E-1	1.40E-9	2.93E+0	644-800	ionpol2	?
	→	$O + CS^+$	2.50E-1	1.40E-9	2.93E+0	644-800	ionpol2	?
$C^+ + CO_2$	→	$CO + CO^+$	1.10E-9	0.00E+0	0.00E+0	10-280	Kooij	?
$C^+ + HCO$	→	$CO + CH^+$	5.00E-1	1.28E-9	3.58E+0	10-800	ionpol1	?
$C^+ + OCS$	→	$CO + CS^+$	8.00E-1	1.68E-9	1.09E+0	10-89	ionpol1	?
	→	$CO + CS^+$	8.00E-1	1.68E-9	1.09E+0	90-800	ionpol2	?

Funding

Manpower:
- ANR Jeune Chercheur (EMA : INC, PI: V. Wakelam) - Engineer - 6 months 2009
- ERC E_3ARTHS (PI: F. Selsis) - Engineer - 6 months in 2009 and 4 months in 2011
- ERC E_3ARTHS (PI: F. Selsis) - 20% of a postdoc - 1 year in 2011
- Europlanet FP7 - Engineer - 8 months 2010
- Laboratoire d'Astrophysique de Bordeaux - Engineer - 2010
- Astronet (CATS project, PI/ P.Schilke) - 9 months of postdoc - 2010
- VAMDC FP7 - salaire ingénieur
- LAB - salaire ingénieur
- ERC 3DICE (PI: Wakelam) - 3 ans d'ingénieur

Travels:
- University of Bordeaux (Institut de Physique Fondamentale) - 2007
- CNRS/INSU/PCMI/PNP - from 2008
- ASOV - 2009
- VAMDC FP7 (PI: ML Dubernet)
- Observatoire Aquitain des Sciences de l'Univers (France)

Who is in the KIDA team?

PI: Valentine Wakelam (CNRS)
Lead programmer: Benjamin Pavone
(non permanent staff - Jan. 2009 - Dec. 2011, Oct. 2013 - Sept. 2016)

KIDA scientific experts 2014-2018:

Astrid Bergeat
Karine Beroff
Marin Chabot
Alexandre Faure
Wolf Dietrich Geppert
Dieter Gerlich
Eric Herbst
Kevin Michael Hickson
Pascal Honvault
Stephen Klippenstein
Sébastien Le Picard
Jean-Christophe Loison
Gunnar Nyman
Stephan Schlemmer
Ian Sims
Dahbia Talbi
Jonathan Tennyson
Roland Wester

No permanent technical support in Bordeaux
No other permanent scientist truly involved

Database activities - KIDA

Communication:

- http://kida.obs.u-bordeaux1.fr/
- News letter
- KIDA on TWITTER (@kida_database)
- KIDA workshops organized every two years

Statistics:

~200 registered users

Pays/Territoire	Acquisition			Comportement
	Sessions ↓	% nouvelles sessions	Nouveaux utilisateurs	Taux de rebond
	5 052 % du total: 100,00 % (5 052)	36,36 % Moyenne du site: 36,30 % (0,16 %)	1 837 % du total: 100,16 % (1 834)	15,08 % Moyenne du site: 15,08 % (0,00 %)
1. France	2 234 (44,22 %)	22,92 %	512 (27,87 %)	12,00 %
2. United States	646 (12,79 %)	50,15 %	324 (17,64 %)	11,30 %
3. Germany	323 (6,39 %)	49,23 %	159 (8,66 %)	9,29 %
4. Japan	187 (3,70 %)	40,11 %	75 (4,08 %)	17,11 %
5. Netherlands	178 (3,52 %)	42,13 %	75 (4,08 %)	12,36 %
6. Sweden	175 (3,46 %)	8,57 %	15 (0,82 %)	52,57 %
7. United Kingdom	149 (2,95 %)	47,65 %	71 (3,86 %)	11,41 %
8. Italy	147 (2,91 %)	31,97 %	47 (2,56 %)	30,61 %
9. Spain	91 (1,80 %)	52,75 %	48 (2,61 %)	10,99 %
10. Czech Republic	85 (1,68 %)	28,24 %	24 (1,31 %)	9,41 %

Database activities - KIDA

Models

File	Comment	Added on
reboussin2014.zip	Type of chemistry : Gas-phase and gas-grains Number of reactions : 9127 Number of species : 703 Publication : Reboussin et al. 2014, MNRAS, 440, 3557 Description : Gas-phase and gas-grains chemical network for dense interstellar medium. The gas-phase has been updated compared to kida.uva.2011, using reactions of carbon chains and nitrogen chains proposed by Loison et al. (2014a,b). The surface network has been modified to include new CRID process.	2014-09-15 13:08:47
Nahoon_public_aug2013_web_unc.zip	Update version of the Nahoon chemical model. Bug fixed on the temperature dependence in case of duplicated reactions with complementary ranges of temperature.	2013-09-04 10:23:13
Hincelin2013.tar.gz	Type of chemistry: Gas-grains Publication: Hincelin et al. 2013, ApJ, in press Description: Format of the network is described in a readme file.	2013-07-26 21:03:23
Chabot2013.zip	Type of chemistry: Gas-phase Number of reactions: Number of species: Publication: Chabot et al. 2013, ApJ, 771, id 90 Description: Two different gas-phase networks are available: one for dense clouds with a format similar to kida.uva.2011 and one for PdR regions with a format similar to the Meudon PDR code (format described at http://pdr.obspm.fr/PDRcode_Chemistry.html). Both networks have been updated according to the suggestions made in the paper.	2013-06-28 10:07:08
osu_highT.zip	Type of chemistry: Gas-phase Number of reactions: 5387 Number of species: 461 Publication: Harada, Herbst & Wakelam 2010, ApJ, 721,1570 and Harada, Herbst & Wakelam 2012, ApJ, 756, id. 104 Description: Gas-phase network for temperatures up to 800 K.	2012-10-05 10:05:10
nls_react_kida_2010_druard.dat.zip	Type of chemistry: Gas-grain Number of reactions: 6215 Number of species: 666 Publication: Druard & Wakelam 2012, MNRAS 426, 354-359 (http://arxiv.org/abs/1207.5325) Description: Network modified in order to include new reactions for polysulfanes, sulphur polymers and CS2.	2012-07-26 14:38:47
PAHs.zip	List of reactions involving PAHs used in Wakelam & Herbst (2008). The format of the network is the same as the OSU database. Some details are given in a pdf file.	2012-06-27 14:15:56
Nahoon_public_oct2011_web_unc.zip	New version of the Nahoon chemical model. See the newly accepted paper by Wakelam et al. (ApJS) for a full description: http://kida.obe.u-bordeaux1.fr/uploads/documents/kida_apj.pdf	2012-01-27 15:13:54
kida.uva.2011.zip	New gas-phase chemical network for dense interstellar medium called kida.uva.2011. This is a new version of the OSU database updated according to the latest recommendations from the KIDA experts until October 2011. The network is described in a paper accepted for publication by ApJS (download here: http://kida.obe.u-bordeaux1.fr/uploads/documents/	2012-01-27 15:11:12
astrochem.html	Astrochem is a code to study the chemistry of a va gas-grain interactions, such as depletion and deso between hundreds of species can be solved in a fe Sébastien Maret.	

~400 downloads per year

File	Comment	Added on
Chemistry_review_S_Titan.pdf	Type of chemistry: Neutral-neutral gas-phase reactions. Publication: The evolution of infalling sulfur species in Titan's atmosphere, Hickson et al 2014, A&A Description: This chemical network was constructed to model sulfur chemsitry for Titan.	2014-09-24 15:00:19
Hebrard2013.zip	Type of chemistry: Neutral-neutral gas-phase reactions Number of reactions: 941 Number of species: 90 Publication: Hébrard et al., 2013 Hébrard et al., 2013 - Astron. Astrophys. (DOI: 10.1051/0004-6361/201220686) Description: This updated chemical network was constructed to model C3 hydrocarbon chemistry in Titan's atmosphere. See the paper for more details. Please refer to the README file included in the .zip file for the reading format.	2013-07-26 21:05:45
Venot2012.zip	Type of chemistry: C/H/O/N neutral-neutral gas-phase reactions Number of reactions: 957+6 Number of species: 105 Publication: Venot et al., 2012, A&A 546, id.A43 (DOI 10.1051/0004-6361/201219310) Description: Gas-phase chemical network for modeling the kinetic evolution of radicals and molecules containing less than three carbon atoms in the atmospheres of hot Jupiters. Please refer to the README file included in the .zip file for the reading format.	2012-07-05 09:57:36
Hebrard2012.zip	Type of chemistry: Neutral-neutral gas-phase reactions Number of reactions: 788 Number of species: 86 Publication: Hébrard et al., 2012 - Astron. Astrophys. (DOI: 10.1051/0004-6361/201218837) Description: This updated chemical network was constructed to model HCN and HNC chemistry in Titan's atmosphere. See the paper for more details. Please refer to the README file included in the .zip file for the reading format.	2012-05-11 10:04:26

The KIDA2015 workshop
from May, 5th to 7th 2015 in Paris (CNES)
(http://kida2015.sciencesconf.org)

Scientific topics:

New results in gas phase chemistry
Heterogeneous chemistry and grain surface processes
Astrophysical modeling of the Interstellar Medium
Astrophysical modeling of (exo)planetary atmosphères.

Invited speakers :

Matthieu Bertin (LERMA)
Sophie Carles (Université Rennes 1)
Berenger Gans (ISMO)
Maryvonne Gerin (LERMA)
Eric Herbst (University of Virginia, USA)
Stephen Klippenstein (Argonne National Laboratory, USA)
Panayotis Lavvas(Université de Reims)
François Lique (Université du Havre)
Sébastien Maret (IPAG)
Marco Minissale (LERMA/UPMC)
Guillermo Muñoz-Caro (CAB, Spain)
Jérôme Pety (IRAM)
Claire Romanzin (LCP)
Evelyne Roueff (LUTH)
Patrice Theulé (Université d'Aix Marseille)
Olivia Venot (KU Leuven, Belgium)

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European Research Council
Established by the European Commission

Observatoire Aquitain
SU
des Sciences de l'Univers

cnes

The KIDA2015 workshop
from May, 5th to 7th 2015 in Paris (CNES)
(http://kida2015.sciencesconf.org)

Responsable du SOC: Pierre Gratier (Postdoc ERC)
Responsable du LOC: Valentine Wakelam

90 participants venant de 13 pays différents
50 contributions soumises

Ce qui a été accomplis en 2014

- Ajout de centaines de réactions chimiques issues de divers publications
- Correction de nombres données de planéto
- Refonte du site web (toujours en cours)
- Développement d'un data modèle pour les réactions de surface
- Release d'un réseau complet kida.uva.2014 pour les applications interstellaires (Wakelam et al. 2015 ApJS)

Feuille de route pour 2015

- Continuer l'ajout de réactions chimiques
- Valider le data modèles de surface
- Commencer à implémenter des réactions de surface (très gros travail notamment d'intercomparaisons car les données viennent d'origine très variées)
- Terminer et délivrer le nouveau site web