

R.D.X

ملف عربي جيد لصناعة المفجر

ENGLISH. تنقية حمض النيتريك من أكاسيد النيتريك

طريقة تشبه المنهج 60 حمض, 35 هكسامين_2.

RDX, or cyclonite, is a very insensitive high explosive compound. The actual chemical name is cyclotrimethylenetrinitramine, although the chemical names hexahydro-1,3,5-trinitro-1,3,5-triazine; Hexogen; trimethylenetrinitramine; sym-trimethylenetrinitramine ;Hexolite; 1,3,5-trinitrohexahydro-p-triazine; 1,3,5-trinitrohexahydro-s-triazine; cyclotrimethylene-trinitramine; 1,3,5-triaza-1,3,5-trinitrocyclohexane; trinitrohexahydrotriazine; and T4 are also used.

RDX itself stands for Royal Demolition eXplosive and comes from Great Britain, cyclonite is the American usage, Hexogen is for Germans, and T4 is Italian. RDX is a very powerful military explosive that can be stored for long periods of time and handled safely. RDX is usually mixed with other explosives and plasticizers to make a variety of useful compositions for military and civilian use, C-4 and Semtex are two such compounds. It seems so much RDX is made that most scientific books give industrial schematics for thousands of pounds instead of lab preparations. The laboratory methods here are not as efficient as in industry, but are fine.(1) **The first method uses methenamine, or hexamethylenetetramine**, which can be purchased as heating tablets or synthesized in the lab.(2) The second makes use of acetic **anhydride, forbidden by the DEA, but it can be synthesized as well.**

(not to much product produced) result around 64 in theory

(1)Put 335 mL of 100% nitric acid in a 500-mL beaker, Arabic important

(2)cool the acid to below 30 °C by setting the beaker in a salt-ice bath. **The nitric acid must be as concentrated as possible**, *it must also be free of nitrogen oxides.*

(3) Slowly add 75 g of methenamine in small portions to the acid while stirring. *The temperature must be kept between 20 °C to 30 °C during the addition.* Once all of the methenamine has dissolved,

(4) slowly heat it to 55 °C while stirring,

(5) hold it to between 50-55 °C for 5 minutes, *keep stirring.*

(6) Now cool the mix to 20 °C then let it sit for 15 minutes. After standing,

(7)it is gradually diluted with three or four times its volume of cool water, this should precipitate the RDX from solution. it may take from minutes to hours to fully precipitate all of the RDX.

(8) Decant most of the liquid then

(9)add 1 L of 5% sodium bicarbonate solution to neutralize the remaining acid. Filter the mixture to collect the crystals of RDX that should have formed. Wash them with cold water, then with hot 5% sodium bicarbonate solution, and again with water.

(10)The RDX can **be dried** at room temperature or in an oven. Further purification can be accomplished by recrystallizing from acetone. You will need a graduated cylinder for measuring liquids, a stirring rod or magnetic stirrer for mixing, and a thermometer to monitor the temperature.

The second procedure(FOR R.D.X) Arabic

is as follows (1) Place 260 mL acetic anhydride in a 1000-mL beaker and

(2)add 105 g **powdered ammonium nitrate** while stirring. Heat the beaker to 90 °C and remove the source of heat.

(3)Very slowly add 38 g of paraformaldehyde to the beaker, this addition will release toxic and flammable fumes, use a fume hood or go to an open area.

After the addition, **add the contents** of the beaker to **twice its volume of cold water** to precipitate crystals of RDX.

Filter the solution to collect the crystals and **wash them with cold water** then boiling water. The RDX can be purified by dissolving in the minimum amount of acetone then diluting with cold water. Filter the crystals to collect them and allow to dry in the open air.

3- السكلونيت (RDX)

درجة الانصهار : 205 م .
الكثافة : 1.82 غم/ملل .
الحساسية : قليلة نسبيا .
السرعة الانفجارية: 8500 م/ث .
درجة بدء الانفجار : 299 م .

الآر دي اكس (RDX=Research Department Explosive) هو مركب شديد الانفجار قليل الحساسية ومن أسماءه السايكلونايت (أمريكا) والهكسوجين (ألمانيا) و التي فور (إيطاليا).

الآر دي اكس هو متفجر قوي جدا وهو أحد أهم المتفجرات العسكرية (المتفجر الأكثر إنتاجا في أمريكا) ويمكن تخزينه لفترات طويلة بأمان، عادة ما يتم مزجه مع غيره من المتفجرات ولا يستخدم منفردا مثل التي أن تي

لتكوين الخلائط المتفجرة B composition أو يمزج مع المواد الملدنة (Plasticizer) مثل زيت البرافين) لعمل مركبات السي c compositions مثل السي فور (C-4) .
 حساسية الآر دي اكس أكثر من التي أن تي ولكنها أقل من بيروكسيد الأستون أو النيترو جليسيرين وأكثر حساسيتها هي للصدمة. لأغراض التقليل من حساسيتها يمكن مزج مسحوق ناعم من الآر دي اكس مع 3% من مسحوق ناعم نترات الأمونيوم أو نترات البوتاسيوم فتقل حساسيتها كثيرا ويزيد ثباتها ويطول عمر التخزين لسنوات عديدة السرعة الانفجارية تختلف حسب الكثافة، والكثافة تعتمد على حجم الحبيبات وطريقة الرص (الضغط) داخل العبوة كما يلي:

الكثافة	السرعة الانفجار
0.8	5000
0.92	5500
1.00	6080
1.35	7400
1.4	7550
1.45	7705
1.70	8380

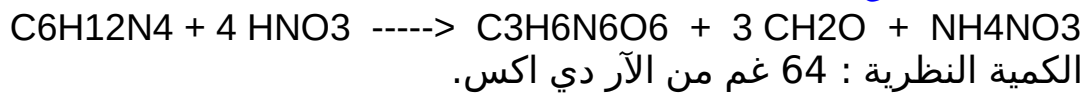
طرق التحضير المخبرية جيدة ولكنها ليست بكفاءة الطرق الصناعية وسأتناول فيما يلي طريقتين للتحضير.

الطريقة الأولى:

المواد المطلوبة:

1. حمض النيتريك المركز (أكثر من 95%) 335 ملل.
2. الهكسامين (من أسماء الميثامين أو هيسكاميثيلين تترامين أو الميثين أمين) 75 غم.
3. محلول بايكربونات الصوديوم تركيز 5%.

معادلة التفاعل:



ضع حمض النيتريك في حمام ثلجي وبردته لدرجة 20 م ثم ابدأ بإضافة الهكسامين ببطء شديد يجب أن تبقى الحرارة بين ال 20م - 30م خلال كامل عملية الإضافة، حرك بهدوء حتى ذوبان كل كمية الهكسامين ثم سخن المحلول ببطء إلى درجة حرارة 55م مع التحريك المستمر، ثبت الحرارة بين

50م-55م لمدة 5 دقائق ثم برد المزيج لدرجة 20م واتركه لمدة 15 دقيقة. ثم أضف له 3 أضعاف حجمه من الماء البارد وذلك ببطء أيضا، هذه الخطوة ستعمل على ترسيب الآر دي اكس من المحلول، قد يلزم الانتظار بضعة ساعات حتى يترسب كامل الكمية، اصفق (زل) معظم السائل ثم أضف لترا واحدا ببطء من محلول بايكربونات الصوديوم لمعادلة الحامض المتبقي. رشح المزيج لتحصل على بلورات الآر دي اكس اغسلها بماء بارد ثم بمحلول بايكربونات الصوديوم وبعدها بماء بارد ثانية. تجفف البلورات بدرجة حرارة الغرفة.

ملاحظا:

1 - تركيز حمض النيتريك ونقاوته أهم عامل في نجاح تحضير الآر دي اكس بهذه الطريقة إذا كان تركيز الحمض قليل فسترتفع الحرارة أثناء التفاعل بسرعة بسبب تفاعلات جانبية غير التفاعل المطلوب حتى يبدأ بالغيان وعندها يجب إيقاف التفاعل وسكب المحلول في حمام الثلج. من أهم الشوائب التي تفسد التفاعل أيضا هو وجود أكاسيد النيتروجين (نستدل عليها من لون الحمض عندما يكون أصفر أو أخضر أو برتقالي) وللتخلص منها يضاف قليلا من سماد اليوريا (ابداً بـ 1% وإن لم تختف الألوان أضف 1% آخر) حتى تختفي هذه الألوان ويصبح الحمض بدون لون، مع انه سيقبل تركيزه قليلا. عادة نحتاج لتركيز أكثر من 98% من حمض النيتريك لنجاح هذه الطريقة بصورة فعالة وناجحة إذا قل التركيز عن ذلك فإن كمية الآر دي اكس الناتجة تكون قليلة جدا وإذا قل عن 90% لا يحدث التفاعل. للتذكير لمعرفة تركيز حمض النيتريك نستخدم الكثافة:

هذا جدول للتسهيل:

التركيز المئوي	الكثافة
100%	1.51
95%	1.49
90%	1.48
85%	1.46
80%	1.45
71%	1.42

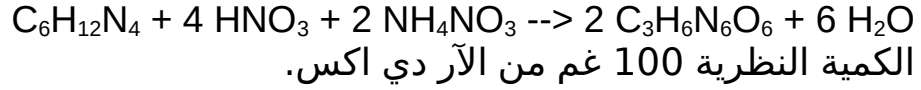
لمعرفة الكثافة نقوم بوزن حجم معين من الحمض ثم نقسم الوزن على الحجم، مثلا إذا كان كتلة 2 لتر (2000 ملل) من الحمض هي 2.950 كغم فإن الكثافة تكون : $2950 \div 2000 = 1.475$ غم/مل ويكون التركيز أقل قليلا من 90% .

الطريقة الثانية:

المواد المطلوبة: عند الشيخ

1. حمض النيتريك المركز 58 ملل
2. نترات الأمونيوم 48 غم
3. الهكسامين 5 غم

معادلة التفاعل:



الطريقة:

برد كمية الحمض في حمام ثلجي حتى 15°م ثم **امزج نترات الأمونيوم مع الهكسامين جيدا** وابدأ بإضافة هذا المزيج إلى الحمض ببطء وعلى دفعات وحرك بهدوء علي أن لا ترتفع درجة حرارة المزيج عن 15 درجة مئوية . بعد الانتهاء من الإضافة والمزج جيدا ضع الخليط فوق مصدر حراري (احذر اللهب المباشر) وارفع درجة حرارة الخليط حتى 80 درجة وثبتها علي ذلك لمدة نصف ساعة وحاول ألا تزيد درجة الحرارة علي 81 وأن لا تقل عن 79 درجة مئوية لمدة نصف ساعة وأفضل طريقة استخدام سخان كهربائي مدرج وثبت درجة الحرارة عند 80 درجة مئوية , أو يمكن مراقبة مقياس الحرارة وعند وصولها إلي 80 درجة نرفع الخليط من السخان قليلا ثم نعيده إذا قاربت الحرارة إلي 79.5 وهكذا .

تنبيه مهم : أثناء التسخين سوف تتصاعد أبخرة مضرّة للعين وللجسم فلا بد من الابتعاد والحذر

بعد الانتهاء من عملية التسخين لمدة نصف ساعة يترك الخليط ليبرد حتى تصل درجة الحرارة إلي 20 درجة مئوية . حبيبات ال آر دي اكس ستكون واضحة والسائل المتبقي هو نترات الأمونيوم .

أن بلورات ال آر دي اكس ستكون متأثرة بآثار حمضية ولنعادلها نقوم بترشيح البلورات ونضعها في إناء آخر ونضيف عليها كربونات الصوديوم بتركيز 5% .

نختبر المحلول كل فترة بالورق الكاشف حتى يتعادل .
برد الإناء الحاوي علي المحلول المتبقي حتى تترسب حبيبات ال آر دي اكس مرة أخرى جيدا

جفف الحبيبات على درجة حرارة الغرفة.

ملاحظات:

1. ميزات هذه الطريقة أنها تعطي ضعف الكمية من الآر دي اكس بالنسبة لكمية الهكسامين المستخدمة وأيضا تحتاج لكمية أقل من حمض النيتريك وتنجح بتراكيز أقل (حتى 85%) بينما الطريقة الأولى لا تنجح بتراكيز أقل من 95% والفرق الثاني هو درجة الحرارة اللازمة للتفاعل وهي 80م بينما في الطريقة الأولى 55م.

2. يجب تنقية حمض النيتريك من أكاسيد النيتروجين أيضا لأنها تفسد التفاعل.

هذا جدول يبين الكمية الناتجة بالنسبة للكمية النظرية من التفاعل بهذه الطريقة وعلاقتها مع تركيز الحمض والزمن:

تركيز حمض النيتريك					الزمن بالدقائق
99%	96%	93%	90%	85%	
نسبة الناتج من الكمية النظرية					

	55.7%				1.5
66.9%	68.7%	40.9%	13.3%		2.5
70.2%	75.3%	65.8%	30.5%		6.5
74.6%	74.7%	73.4%	45.4%		12.0
80.9%	79.2%	77.2%	59.9%	14.9%	24.0
80.5%				26.2%	50.0
				33.0%	100.0
				32.6%	120.0

لاحظ أنه لو عندك تركيز 85% من حمض النيتريك فيمكنك فقط الحصول على حوالي ثلث الكمية النظرية إذا أبقيت المحلول لمدة ساعتين على درجة حرارة الـ 80م كما سبق بيانه بينما لو التركيز 96% فإن 24 دقيقة (الزمن الذي أوصينا به في الطريقة هو نصف ساعة) كافية لإنتاج 79.2% وهي نسبة ممتازة.

تنقية الآر دي اكس

لتنقية الـ آر دي اكس المصنع من الطريقتين من الشوائب نقوم بالاتي :
ضع كمية من الأسيتون في إناء زجاجي فارغ وسخنه بحمام ماء حتى 80 درجة مئوية وأضف مادة الـ آر دي اكس ملعقة ملعقة حتى تذوب أكثر كمية منه في الأسيتون وتتركه ليبرد في درجة حرارة الغرفة 25 درجة مئوية
بعد ساعة ستظهر الحبيبات النقية مرة أخرى ونقوم بترشيحها وحفظها في إناء محكم القفل بعد تجفيفها في درجة حرارة الغرفة .

Making R.D.X Plastic

Composition C-1 can be made by mixing 88.3% R.D.X. (by weight) with 11.1% mineral oil, and 0.6% lecithin. Knead these material together in a plastic bag. This is a good way to desensitize the explosive.

COMPOSITION 'C' - This explosive is just a copy of a British explosive that was adopted early in WWII. This explosive is the 'C' explosive of choice for home manufacture due to its ease of manufacture and the more easily obtained compound. This explosive was available in standard demolition blocks. The explosive was standardized and adopted in the following composition:

R. D. X.	88.3 %
Heavy Mineral Oil	11.1 %
Lecithin	0.6 %

In this composition, the lecithin acts to prevent the formation of large crystals of R.D.X. which would increase the sensitivity of the explosive. This explosive has a good deal of power. It is relatively non-toxic except if ingested and is plastic from 0-40 deg. C.. Above 40 deg., the explosive undergoes extrusion and becomes gummy although its explosive properties go relatively unimpaired. Below 0 deg. C., it becomes brittle and its cap sensitivity is lessened considerably. Weighing all pros and cons, this is the explosive of choice for the kitchen explosives factory due to the simple manufacture of the plastic compound.

Manufacturing this explosive can be done in two ways. **The first** is to dissolve the 11.1 % plasticizing in unleaded gasoline and mixing with the R. D. X. and then allowing the gasoline to evaporate until the mixture is free of all gasoline. All percentages are by weight. **The second method** is the fairly simple kneading of the plasticizing compound into the R.D.X. until a uniform mixture is obtained. This explosive should be stored in a cool dry place.

C-4 is cheap because of the **polyisobutylene (P.I.B.)** binder/plasticizer used. P.I.B. is widely used in the manufacture of calking compounds and even used in Bazooka bubble gum. This would be a possible source of the plasticizer for home C-4 manufacture. The P.I.B. compound desired should have a molecular weight of over 1,000,000. One source of this is from Gulf Oil Co. (chemical division) under the product designation of MM-120.

Di-Ethyl hexyl sebacate is available as a plasticizer component in many chemical and manufacturing processes.

Motor oil is available from any auto parts house or even K-Mart. **The solvent used** in the manufacture is unleaded gasoline (Heptane). The detonation rate of this explosive will be over 8000 M/sec. This will yield an explosive identical to the military C-4. It can be used for any high explosive work such as demolitions and fabrication of shaped charges. The closest commercial product is the Detaflex series if explosives as made and distributed by DuPont. These are not the same but their uses would be very similar.

MANUFACTURE #2 :

Place 21 grams of finely powdered polyisobutylene in a glass container. To this is added 100 ml of unleaded gasoline (camp stove gasoline). This is allowed to stand until the P.I.B dissolves completely. To this liquid is added 53 grams of ethyl hexyl sebacate (Di-(2- ethylhexyl) sebacate) and 16 grams of ten weight nondetergent motor oil. Allow 60 ml of the gasoline to evaporate and then mix, by kneading with gloved hands, with 910 grams type B R.D.X. (see R.D.X. section of this book). This is kneaded until a uniform mixture is formed. It is then rolled out thin and allowed to set for two hours. It is again kneaded for 5 minutes with gloved hands. This rolling out and kneading process is repeated until the gasoline can no longer be smelled. The final product will be plastic from -60 to 170 degrees F. It will be a dirty white to light grey in color and will have the consistency of a stiff putty. P.E.T.N. could replace all or part of the R.D.X. as could most crystalline high explosives. Acetic anhydride is commonly available and thus most likely could be bought. The commercial product as always will be more consistent and much easier and more expedient. This process does however work. Efficiency is in the 85 to 90% range based on the amount of acetone used.

SILICONE OIL PLASTIQUE #5

This plastique is a good choice. It can use a variety of explosives for the main explosive in the compositions. These are: Picric Acid (Kitchen Improved Plastic Explosives), Nitro Starch, P.E.T.N., R.D.X., Pentryl, T.N.T., Tetranitronaphthalene (Kitchen Improved Blasting Caps) and other crystalline high explosives. Of course the detonation velocity will vary per explosive filler used. This plastique will exhibit good plasticity from -60 to 170 degrees F.

MANUFACTURE:

A polymerizable silicone oil with a viscosity of 1000 centistrokes at 100 degrees F. is obtained (G.E. Silicone oil #81245 or equivalent). 500 grams of this oil would be placed in a stainless steel pan. 2.5 grams benzoyl peroxide (This peroxide is widely used as a catalyst in the plastic industry). is added and the mixture is stirred to mix. It is then heated to 125 degrees C. and held at that temperature for 10 minutes. This oil will polymerize to a thick tacky gel. This gel is added to 3.3 Kg. of one of the powdered high explosives (see above). This is kneaded in a plastic container until a very uniform mixture is obtained. The resulting doughlike mixture would then be ready for use. This plastique explosive should be sensitive to a #6 cap with most of the explosive fillers above. The exception would be T.N.T. It would require a #8 or larger cap for proper detonation.

SILICONE PLASTIQUE #6

This plastique makes use of a polymerizable silicone oil matrix with a crystalline high explosive. This gives plastique explosives with good high and low temperature plasticity. Storage stability is good and the detonation velocity is very high as well as is the brisance. The oil is gelled by heating with benzoyl peroxide. The gell formed is

mixed with the powdered high explosive. This is kneaded with gloved hands until a uniform mixture is formed. High explosives used can be one of the following: R.D.X. (see Kitchen Improved Plastic Explosives or section in this book), PETN (See Kitchen Improved Plastic Explosives or the section in this book), Picric Acid (See Kitchen Improved Plastic Explosives), Mannitol Octanitrate (see Kitchen Improved Blasting Caps), Tetryl (see Kitchen Improved Blasting Caps). Explosive performance will vary, of course, with the high explosive used. R.D.X. and P.E.T.N. will give the highest performance. This plastique is easily made and has very high performance. The precursors are not as easily found as other plastique formulations in this book.

Detonation velocity will be between 6700 M/sec. to 8100 M/sec. This variation will depend upon the high explosive chosen.

MANUFACTURE:

Obtain a polymerizable silicone oil with a viscosity @ 100 degrees F., of 1000 centistrokes. Place 150 grams of the oil in a beaker. To this is added .75 grams of benzoyl peroxide. This peroxide is widely used as a catalyst in the plastic industry. The mixture is heated with stirring until the oil polymerizes into a stiff tacky gell. Mix this gell intimately with 850 grams of crystalline high explosive. This is mixed by stirring or kneading with gloved hands until a very uniform mixture is formed. This explosive is plastic from -65 degrees F. to 170 degrees F. It is sensitive to a #6 blasting cap. It is almost an equivalent of C-4 in power and in usability.

OSHITSUYAKA JAPANESE PLASTIQUE EXPLOSIVE -

An explosive that will lend itself to home manufacture is this explosive that was used by the Japanese in WWII. It is an explosive that was used in ribbon charges and demolition rolls. Of course, the main ingredient is R.D.X. which composes most of the explosives weight. This being a plastique explosive with a wax plasticizer is limited in the temperature that can be used. These properties can be improved on somewhat by the substitution of short fiber grease (wheel bearing grease) or bees wax for part of the percentage

of wax. Their composition is as follows:

R.D.X. (see R.D.X. manufacture)	80 %
Wax (1/2 wax, 1/2 wheel bearing grease)	20 %

SILICONE OIL/AMMONIUM

PERCHLORATE PLASTIQUE #4

This plastique is easily made. Precursors are very simple to obtain. This mixture of ammonium perchlorate and copper chromite has all the power that R.D.X. has. I do not believe the detonation velocity will be as high however. It is cap sensitive and very powerful. The copper chromite component of this explosive composition is available as a chemical reagent and as a catalyst. Ammonium perchlorate is widely available as an oxidizer in pyrotechnics, solid rocket propellants, and JATO motor construction. This explosive plastique would be a very good choice if the precursors are available.

MANUFACTURE:

Take 1 parts by weight of silicone paste (Dow Corning Silastic 126 or equivalent) and 2 parts silicone oil (Dow Corning Product #9996 or equivalent) and place in a stainless steel pan. Add to this .015 part benzoyl peroxide. Stir in well. Heat this mixture to 135 degrees for 15 minutes and let the thick gell cool. In another container 95 parts of ammonium perchlorate are mixed carefully with 5 parts copper chromite. These are of course finely powdered before mixing. Mix these together until a uniform mixture is obtained. Fifteen parts of this gell are added to 85 parts the explosive mixture from above. This mixture is kneaded until a very uniform consistency exists. This will yield an explosive of great power and very good

plasticity. One would want to use a #8 cap for this explosive to ensure good performance.

In a pan place 10 grams of **short fiber wheel bearing grease**. Heat this grease until it melts. Let this cool to 75 degrees C. Pour this into 100 grams of nitrostarch

RED PHOSPHOROUS-COFFEE-SILICONE OIL**This**

plastique is powerful and cap sensitive. It is a high performance explosive with a 60% dynamite equivalency. It is very similar to the composition in Kitchen Improvised Fertilizer Explosives. It uses this explosive's high power and cap sensitivity coupled with a polymerized silicone oil. **The addition of the dried coffee (e.g. instant, freeze dried) and raises the detonation velocity greatly and subsequently the power.** It is simple to prepare, powerful and cheap. These parameters are very important to the home explosives manufacturer.

MANUFACTURE:

Powder 190 grams of **ammonium nitrate** (powdered fertilizer) and place in a wide mouthed container of glass or stainless steel. To this is added 7 grams soybean oil, 2 grams red phosphorous. This is carefully stirred until a uniform mixture is formed. In a separate container place 14 ml water. In a separate container mix 8 grams of silicone oil (General Electric Product #SF-96 or equivalent) with 0.1 grams of benzoyl peroxide. Heat this mixture to 120 degrees C. for ten minutes until a stiff gell is formed. It is then kneaded with gloved hands into the powdered explosive in the other container. Knead this composition until it is of a uniform consistency. **When uniform knead in 1 gram of instant coffee.** Glassmicro balloons can be used here instead of said instant coffee. When this mixture has been kneaded to a highly uniform mixture the explosive is ready for use. This explosive can be considered the equivalent of 60% straight dynamite and is sensitive to a #6 blasting Gap at temperatures as low as -10 degrees F.

COMPOSITE PLASTIQUE #1

Hexamine, Ammonium nitrate, Sodium nitrate, Guar gum, Potassium perchlorate, potassium dichromate

This explosive composition **is simple and cheap to make**. Unlike other compositions in this book this composition is as simple as making bread dough or other similar very familiar processes. This mixture is cap sensitive but would require it's use in larger quantities than explosives containing crystalline high explosives. Ingredients are simple to find and cheap. **Hexamine is available** as army ration heating tablets. Nitric acid can be either bought or made (see nitric acid MFG.). **Ammonium nitrate** is available as a (common) fertilizer. **Sodium nitrate** is commonly available from chemical suppliers. **Potassium perchlorate** can be obtained from fireworks suppliers. **Guar gum** is obtained from oil well drilling mud suppliers, Henkel Corp. (Minneapolis, Minn.) or other suppliers. Detonation velocity is not as high as others but this explosive is powerful and brisant. Detonation velocity should be

around 5500 M/sec. This explosive should be made up as needed to ensure the gell is good and stiff.

MANUFACTURE:

In a large mouth gallon jar place 60 ml. of water. In this liquid dissolve 40 grams of hexamine (see Kitchen Improvised Plastic Explosives for manufacture instructions). Add nitric acid of any strength available to this solution until it has a Ph value of 5.0-5.4. This can be checked with litmus paper (e.g. E Merick brand). The addition of the acid to this liquid should be done at such a rate so the temperature does not rise above 66 degrees C. To this liquid add 12 grams of potassium perchlorate, 16 grams of sodium nitrate and 80 grams of ammonium nitrate. This mixture is stirred until all the solids dissolve into the solution. To this liquid add 161 grams of ground ammonium nitrate mixed with 6 grams of guar gum. Stir the mixture until it begins to thicken appreciably. Dissolve 1/2 gram of potassium dichromate in 1-2 ml. of water and add into the mixture with stirring. Stir until this crosslinking agent is thoroughly dispersed throughout the gelled explosive. To this gelled explosive add 20 grams of very fine aluminum powder. This is stirred or kneaded (with gloved hands) into the explosive gell. Without this aluminum addition the explosive will not be cap sensitive. This explosive is then placed in a moisture free storage place. This gell will only keep 6 months at ordinary temperature. It would be made up only as needed

INFO ON Primary chemicals used in the Synthesis of R.D.X

Acetic Anhydride, (حمص الخل اللامائي) colorless, volatile, mobile (free-flowing) liquid, $(\text{CH}_3\text{CO})_2\text{O}$, with an irritating odor. It is primarily employed as an intermediate in the manufacture of industrial chemicals, pharmaceuticals, perfumes, plastics, synthetic fibers, explosives, weed killers, and other chemical products. It is manufactured by the dehydration of acetic acid or by the oxidation of acetaldehyde. About 75 percent of the acetic anhydride produced annually in the United States is used for the manufacture of cellulose acetate, and about 1.5 percent is used for the manufacture of aspirin. Acetic anhydride melts at -73°C (-99.4°F), boils at 139.6°C (283.3°F), and has a density of 1.082 g per ml .

Anhydride compound formed by removal of water: a chemical compound formed when water molecules are removed from another compound .

Lecithin, in biochemistry, any of a group of chemicals found in all living tissues. In animals higher concentrations are found in nerve tissues and red blood cells; lecithins also occur in plants and in egg yolks. They are phospholipids (see Lipids), esters of glycerol with other organic molecules. Waxy substances that can be dissolved in alcohol or ether, lecithins are used as emulsifying agents in margarine and other foods. Commercial lecithins come mainly from soybeans.

Paraformaldehyde. Large-scale production of low-priced paraformaldehyde in flake form disclosed the possibility of its use as a replacement for formaldehyde by the plastics industry and the other industrial consumers which last year used 624 million lb. of the latter product. To the thermosetting plastics producers paraformaldehyde would afford advantages and efficiencies in reaction, storage, handling, and shipping, to a degree that might drastically change present production techniques and costs. The new paraformaldehyde was said to be more water soluble and less dusting in its flake form, and it offered less variation in reactivity.

Formaldehyde, compound of carbon, hydrogen, and oxygen, with the formula HCHO or CH_2O . Formaldehyde was discovered in 1867 by the German chemist August Wilhelm von Hofmann. It is the simplest of the aldehydes. At ordinary temperature it is a gas with a very pungent odor. It can be compressed into a liquid that boils at -21°C (-5.8°F). Formaldehyde is prepared industrially by heating dry air and methyl alcohol vapor in the

presence of a catalyst, such as copper or silver. More direct processes, whereby formaldehyde is synthesized from carbon monoxide and hydrogen, have been developed. In one process, water gas is passed over a catalyst at a temperature between 200° and 300° C (392° and 572° F) under a pressure of 7757 torr (150 lb/sq in). Pure formaldehyde is very reactive and polymerizes easily. See Plastics; Polymer.

Formalin is a trade name for a solution containing 40 percent formaldehyde and 60 percent water or water and methyl alcohol; it is employed as a disinfectant, insecticide, fungicide, and deodorant. Formaldehyde is used extensively in the chemical industry in the synthesis of organic compounds. Its most important use is in the manufacture of synthetic resins. Recent tests have indicated that it is a **carcinogen**.

Aldehydes, class of organic compounds that are important in the manufacture of plastics, dyes, food additives, and other chemical compounds. Aldehydes have the general formula where R is either a hydrogen atom, as in the case of formaldehyde, or an aliphatic or an aromatic hydrocarbon group.

Petrolatum, odorless, tasteless, greasy substance, obtained as the residue from petroleum after the lighter and more volatile components have been boiled off. The purified residue is obtained in the form of a yellowish or decolorized semisolid, known as petroleum jelly, or by various trademark names, such as Vaseline, and in the form of a clear to faintly yellow liquid, known as **mineral oil**. The semisolid form is used as an unguent and as a base for pharmaceutical ointments; the liquid form is used as a laxative.